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# ANCIENT EGYPT AND THE EAST

1934.

3251 JUNE.

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EDITORS: PROF. SIR FLINDERS PETRIE, F.R.S., F.B.A.  
DR. M. A. MURRAY.  
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1934.

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QUEEN TETY-SHERY.

*(By Courtesy of the Trustees of the British Museum.)*

# ANCIENT EGYPT AND THE EAST

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## TREASURES OF ANCIENT GAZA.

THE past season has been most successful in the discovery of fine work, foreign connections, and foreign trade at Ancient Gaza. The southern end of the Tell, over four acres, was completely excavated; it had been greatly denuded, but remaining buildings were planned. Also a large number of tombs were found, which contained untouched burials. These were none of them later than the Hyksos age, and some may well be of the XIIth dynasty.

The amount of gold work which remained was surprising, and not only in tombs but in three hoards which belonged to dealers in old metal. Several reliefs of gold and silver were doubled up into lumps ready for melting. Happily, the largest piece was uninjured (see fig. 1 centre, scale  $\frac{2}{3}$ ). This is a pendant for a worshipper of the Great Mother-goddess of Syria, in polished gold. At

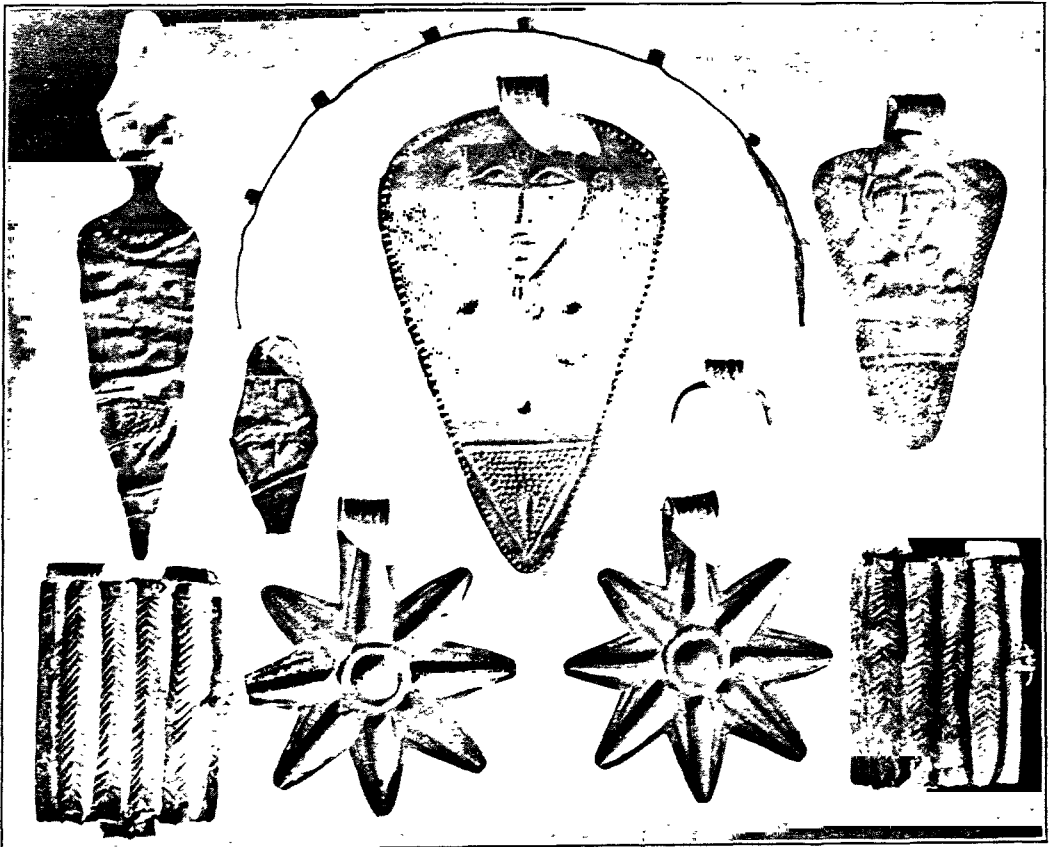


FIG. 1.—THE GREAT MOTHER, STARS, &C., IN GOLD. ( $\frac{2}{3}$ )

the right hand is a lesser plaque showing the goddess with the head-dress of Hathor. On the other hand is a figure of the goddess in silver. Below are two large stars of embossed gold, between two pieces probably from a gold belt. The curved bar above is a frontlet of electrum with seven sockets to hold golden flowers, such as were found loose in the burials.

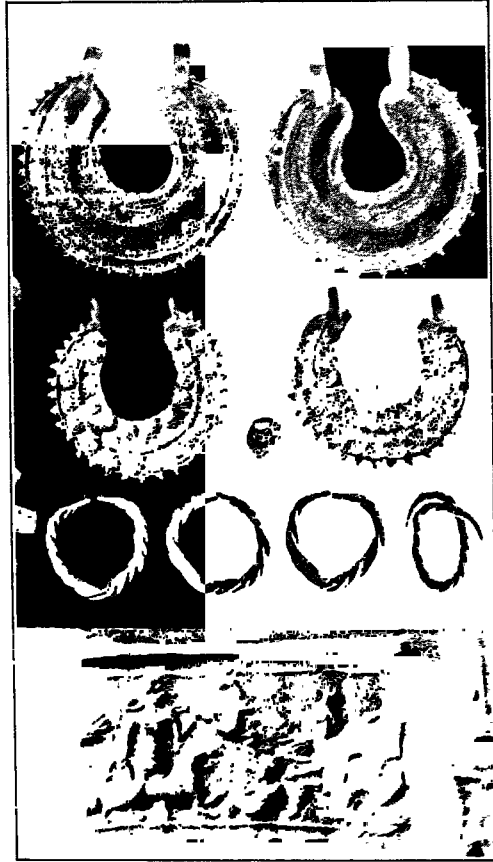


FIG. 2.—GOLD EARRINGS, CYLINDER SEAL. ( $\frac{2}{3}$ )

In the same hoard were gold earrings (fig. 2) covered with granular gold work as triangular piles of pellets. Two plates were embossed, and then joined together at the edges before the granules were fixed on and added around the edge. Such work has not been seen before. Below are twisted gold earrings of the Irish pattern.

An extraordinary type of earring (fig. 3), found in a grave, had a central disc, a superposed oval, and pointed wings of blue glass inlay in a gold frame, ending below in a ram's head. Underneath is a string of beads of onyx and blue glazed quartz; below are gold beads and a string of silver beads. At the top of the group is part of an embossed diadem of gold. A great variety of gold ornaments was also found, about 150 objects, of which more than a third are duplicates. No true soldering was used, except silver on gold in a few instances; the regular joining is by autogenous solder, that is, sweating the surfaces together when plastic.

Scarabs were thrice as many as before, over 450 in this season. They are nearly all of Canaanite facture; a new name is that of a king Yma-Set, besides

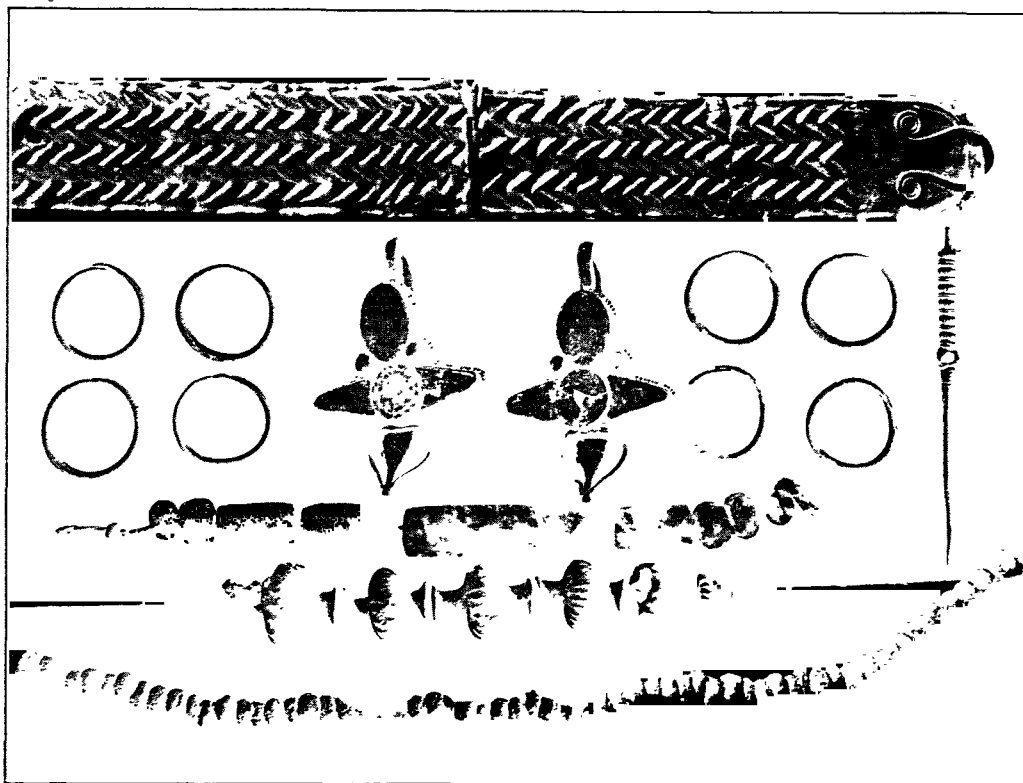


FIG. 3.—DIADEM AND CRUCIFORM EARRINGS. ( $\frac{2}{3}$ )

the well-known kings Ra-maot-ab, Ra-oa-hetep, and Shesha. Some cylinders of haematite were mostly of rough work; one, however, is very minutely engraved (see base of fig. 2). It represents a man, with long hair-curl at the back, holding in the left hand the tail of the goat-fish emblem of Ea, and in the right hand the tail of a lion. The beast is advancing ferociously on a man sitting helpless on the ground. Behind him is a winged figure of Horus, with falcon head and crown of Egypt, advancing with outstretched hands to protect the seated man. It may be a political scene of Palestine helpless, attacked by Syria and supported by Egypt; but it is at least a thousand years earlier than



FIG. 4.—CRANES PAINTED ON JAR.





FIG. 5.—GEESE PAINTED ON JAR.

any such history known to us. The excellent proportions and fine work are more northern than southern.

More painted pottery was found, especially in a stone-lined pit in a tomb. This contained various forms not known before, besides parts of four painted vases. On the shoulder of a great jar were two scenes of cranes (fig. 4), fighting,

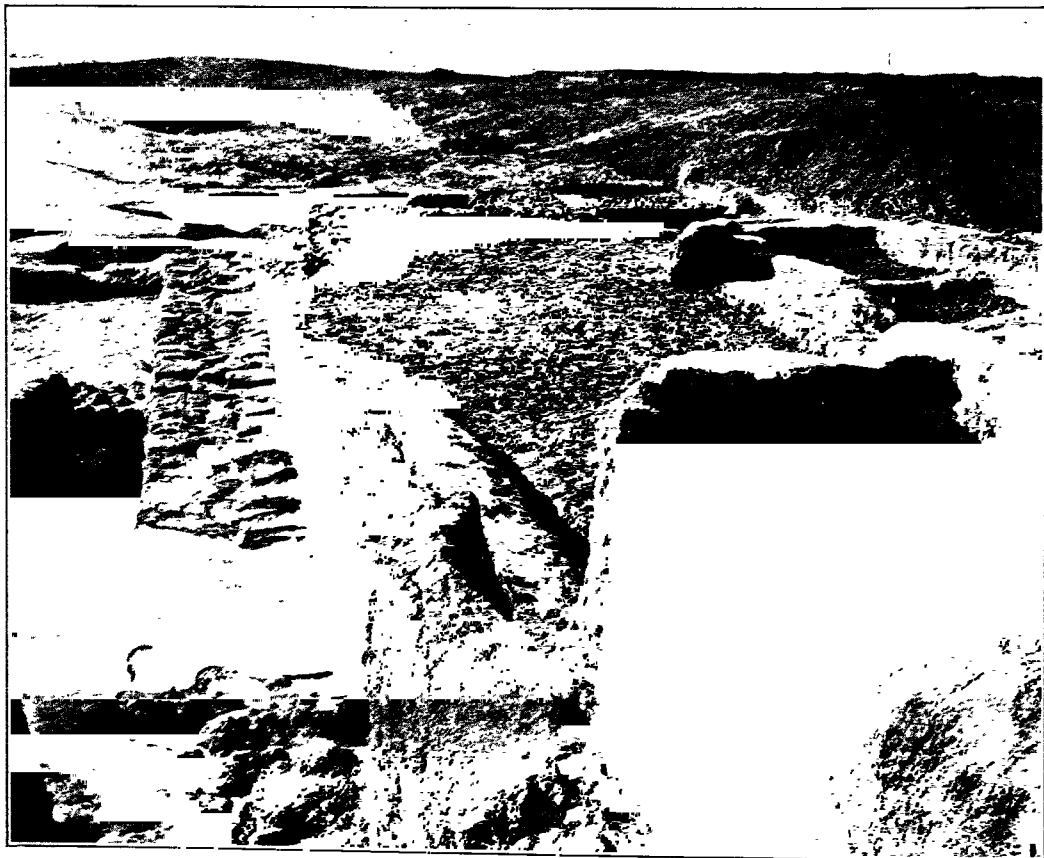


FIG. 6.—STONE WALLING OF LARGE BUILDING.

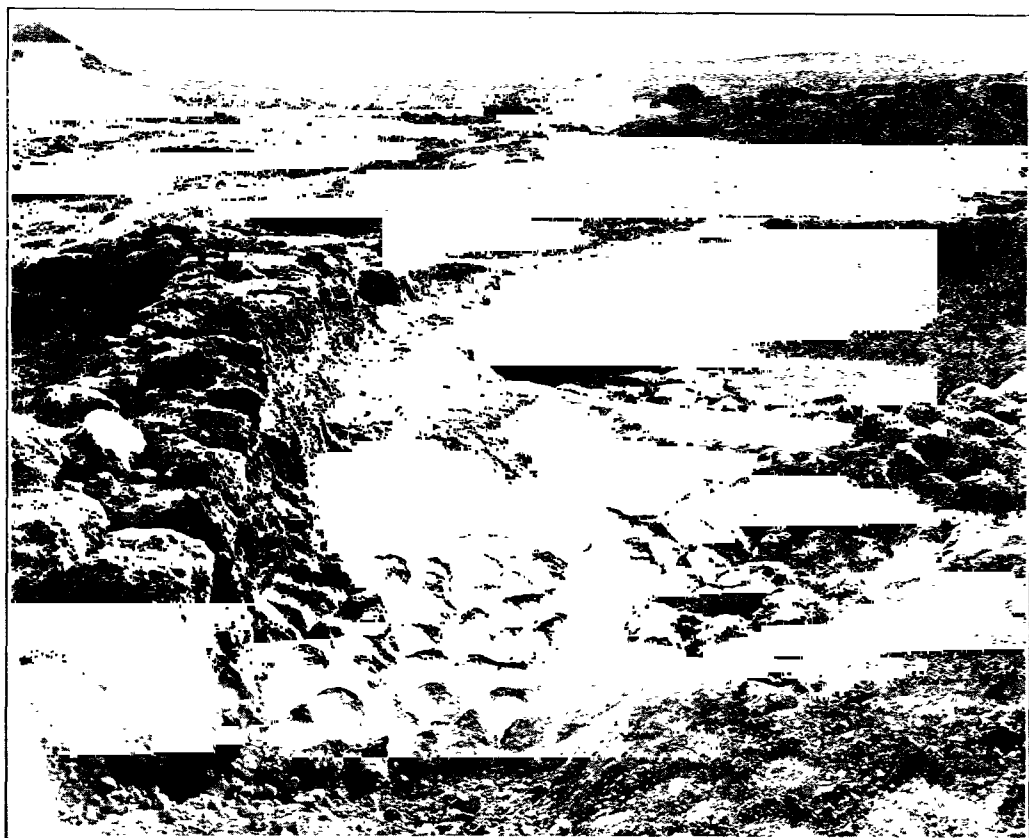


FIG. 7. DOORWAY AND WELL.

and eating a fish. Part of another jar had two figures of geese (fig. 5). A third jar of similar style found elsewhere was perfect. The style differs from that found before, red bars being added across the brown ground. The group in the pit has a relative date, given by a sherd of the fine Anatolian style of bowl, and another of the earliest Cypriote imitation. This junction of styles dates from the XIIth dynasty.

The flow of weights was far more than in previous years—over two hundred, mostly of hæmatite. The greater part were found in the south-west corner of the city, where a long sloping way ascends to the top from the point nearest to the water. This was doubtless the port entrance (*Gaza* III, vi), and most of the trade went on in this quarter. It is surprising how small the weights are, mostly under an ounce; a few larger weights of a pound or two were found and none above that. What could have been the material traded in such small quantities? Hardly precious metals or drugs as the staple commodities, certainly not food in these small amounts. The Syrian standard of 164 grains, and the Persian of 182 grains, were equally common at Gaza, and together they equal the frequency of the Egyptian, even at the frontier of Egypt. So the Persian trade would seem to have had half the activity of the Egyptian. Another large, bronze dagger was found, of Luristan type, dated to the XIIth dynasty like the example last year.

A large and regular rectangular building was unearthed, with a course of stonework through the walls. In fig. 6 a long wall turns to the right to other chambers; at the furthest right is a stout brick wall which backed the whole

structure. In fig. 7 a doorway hollow is in the foreground, with higher courses of stone on each side. The doorway led out to a great well in a circular pit, seen in the background. This well had been made in the fashion of that in the cemetery (*Gaza I*, lv, 256), where a large pit was dug, the stone-lined well was built in the middle of it, and the earth thrown back round the lining. This is a tedious but safe way of building a stone-lined well without underpinning. We could not clear the full depth, as the masonry had given way below, and it would be sixty feet down to water.

From all these kinds of objects we gain year by year a firmer view of the great activity of intercourse all over the civilised world before 2000 B.C., and perceive how from that the world fell into barbarism that was not cleared away till the early classical age.

FLINDERS PETRIE.

## QUEEN TETY-SHERY.

(*Frontispiece.*)

OF the two statuettes of Queen Tety-shery, one is now in the British Museum, the other in the Louvre. They were dedicated by an official named Sen-senb, who may perhaps have belonged to the queen's own household. The statuette is of fine white limestone and stands 14 $\frac{3}{8}$  inches high. The queen is seated on a backless throne, her hands on her knees, and the figure leaning slightly forwards in a natural attitude. The whole statuette has been painted and much of the colour still remains; the base, throne, and dress are white; the eyes, eye-lashes, eyebrows and hair are black; the vulture-headdress is blue with red in the spaces between the tips of the pinion-feathers. The circular socket on the brow was for the insertion of a vulture-head; the wings of the bird hold the braids of hair in position on each side of the face; the body of the bird spreads over the top, and the wide tail falls over the back of the head; on each side the vulture holds a *shen*-sign in its claws. It is noticeable that the only ornament worn by the queen is the headdress; neither necklace nor bracelets are indicated. Though Tety-shery lived to a great age, she is here represented as a young girl, and the artist has delighted in the delicate modelling of the youthful contours. The artistic workmanship and beauty of the whole of the upper part of the figure are in marked contrast with the coarse rendering of the ankles and feet; the hands also are flat and conventional; but in spite of faults, the statuette is one of the most beautiful portraits of women to be found in the whole range of Egyptian art. Tety-shery was the mother of King Seqenen-Ra and of his queen, Aah-hotep, and lived during the troubled but triumphant times of the expulsion of the Hyksos invaders from Egypt, *i.e.*, from the end of the XVIIth dynasty to the beginning of the XVIIIth dynasty.

M. A. MURRAY.

[NOTE.—A side-view of the head and the inscriptions on the sides and back of the head will be published in the next issue.]

## GLASS BEFORE 1500 B.C.

IN this paper I am referring to every piece of glass that I know of, that dates to before 1500 B.C. or that has been stated to date to that period, and particulars are given of those that I have personally examined.

Before going into detail it is necessary to define what glass is, and to point out the differences between glaze, glass, faience and frit. Glaze and glass are frequently identical materials chemically, but have been worked in different ways. They are isotropic, and therefore do not change the colour of the light when viewed in a polariscope. Glass articles are generally made completely of glass, whilst glazed articles usually consist of a layer of glaze applied to a core or base of other material.

Glass, glaze, and faience are all made of similar materials. Their chief constituent is silica; they all contain lime. Glass and glaze also contain soda, whilst small quantities of soda are usually present in faience. In ordinary glass, 6 to 10% of lime, 15 to 20% of soda and the balance silica is a common formula. In faience, however, the proportions are very different; the silica varies from 94 to 99%, the lime is generally about 2%, whilst the soda when present is often from  $\frac{1}{4}$  to 1%.

Glass is made by heating the ingredients in a crucible until they are liquid and the materials dissolved, when it is either poured out as a liquid into a mould, or pulled out as threads when in a plastic condition, or else allowed to cool and then is broken from the pot.

Faience, on the other hand, is moulded to shape as a powder lightly held together with some liquid, such as milk of lime, and then heated until the lime or soda has sufficiently dissolved to hold it together properly.

In some cases glaze seems to have been mixed with the material before firing; in other cases it appears to have been added afterwards.

Glaze, which is so closely allied to glass, has been made extensively from the Badarian period in Egypt, the Jemdet Nasr period in Mesopotamia, and from an early date in the Aegean. It is probable that it was invented accidentally by heating an alkali or lime on a quartz pebble, and finding that the result put a polished surface on the stone; many of the glazed quartz beads of Mesopotamia were made in this way. The idea of grinding up quartz and mixing it with an alkali so as to form a faience was probably later, as faience has not been found in the Badarian civilization. It is found, however, in the early Predynastic period at least as early as 4000 B.C., and it is strange that the further development of casting or carving lumps of glaze into special articles was not invented for some thousands of years. As a matter of fact, the evidence is quite conclusive that glass was occasionally made before 1500 B.C., but specimens are very rare.

In the list which I give later there are 28 reputed examples; but of these, some are not glass, others are of more recent date, and others are doubtful.

Faience is very similar to the quartz bricks used for high temperature furnaces. It has been suggested that it should be called "glazed siliceous ware," but the name "faience" has been applied to it for so long that it would be difficult to alter it now.

Frit is a chemical compound, a double silicate of lime and copper. Its nature and methods of manufacture have been described by Laurie.

Since then Miss Hodgson (Armstrong College, Newcastle-on-Tyne) has shown that by powdering the material after it is made and then mixing it with a little water, it can be moulded into beads which retain their shape. When these are fired in a furnace the grains are softened sufficiently for them to stick together and form a hard frit bead. Frit is crystalline and pleochroic, and is quite definitely different from glass.

If a batch of glass has not been sufficiently fired to melt all the quartz completely, you can get a material which has been worked as glass, but when examined under the microscope shows a number of quartz grains floating about in an isotropic base. This is, I consider, a real glass and it is quite easy in most cases to tell it from faience.

Care is also necessary when a faience article has a very thick glaze on the outside. Such cases it is sometimes impossible to tell from glass, unless there is a chip which goes right through the glaze.

There are several natural materials which are sometimes mistaken for glass. Three of the most frequent are the clear crystals of quartz, calcite and fluorite. The first, quartz, can be readily distinguished by its greater hardness ( $H=7$ ) and by its being doubly refractive. The second, calcite, is very much softer than glass, its hardness being 3, whilst that of glass is about 6. It is also markedly doubly refractive. This frequently makes it show a double image, and is immediately seen in a polariscope. The third, fluorite, is also softer than glass ( $H=4$ ). This material is isotropic so that polarized light is not a method of distinguishing it from glass, but it nearly always has some slight flaw or chip which shows the direction of the cleavage planes. It always has a specific gravity of approximately 3.15. This is higher than most early glass, which unless it contains lead generally has a sp.g. of about 2.4-2.6.

Beads of all these materials have been sent to me as being glass.

Another material of which a great number of early beads are made, and which is sometimes mistaken for artificial glass, is obsidian. This is a natural glass; it can almost always be distinguished from artificial glass, if a chip can be examined under the microscope. The natural material has layers of different density. Also, almost all the obsidian found in Europe and Asia is a dark colour which looks black when it has a thickness of about a quarter of an inch. The hardness is  $6\frac{1}{2}$  and the sp.g. 2.32-2.38.

The date of the origin of glass is not known; nor is its country of origin. The popular story of its invention by the Phoenicians in about the sixth century B.C. has been proved to be wrong so far as date is concerned. The date 1500 B.C. seems to have been a landmark in the history of glass, possibly due to its introduction into Egypt, for after this date great numbers of articles were made in glass in Egypt, in Mesopotamia, and in the Aegean. Specimens before this date are very rare, with the possible exception of specimens from Mesopotamia where glass may have been used in considerable quantities about a couple of centuries earlier.

This matter also bears on the question of its country of origin.

The specimens in the following list are all said to date to before 1500 B.C. They are approximately in the order of their reputed dates.

## No. 1.

Description: Hathor Head.

Found by Sir W. Flinders Petrie at

Made of: Blue-violet glass (?).

Naqada, Egypt (Grave 1759).

Date claimed: Predynastic 4000-3500 B.C. Now in University College, London.

Reference: Sir W. F. Petrie, *Prehistoric Egypt*.

Petrie says: "The glass is an opaque violet blue, in imitation of the finest lazuli. The impress is imperfect, the bars across the top having been pressed across the face. Ancient conchoidal chipping proves the material to be glass. The grave, No. 1759, is well dated by 8 types of pottery . . . so it would be impossible to bring it much later than 41 s.d. The glass pendant was found in a small alabaster vase, placed with the horn cup between the forearm and the upper arm so there is no chance of its having been dropped by plunderers from elsewhere. It does not seem possible therefore to question (1) the making of violet frit, the most difficult kind, and (2) the production of moulded glass, at the beginning of the second civilization. Probably imported."

It is some years since I saw this specimen, and then I thought it looked very like faience. So far as I know, this specimen has never been tested chemically or microscopically to prove that it is glass. Under these circumstances, I include it amongst the doubtful specimens.

## No. 2. (Fig. 1).

Description: Bead.

Found by Sir W. Flinders Petrie at

Material: Glass.

Naqada, Egypt.

Date claimed: Predynastic 4000-3500 B.C. Now in Berlin Museum.

Reference: B. Neuman and Kotiga, *Zeit. Angewandte Chemie.*, September, 1925.

Photograph kindly supplied by the Egyptian Department of the Berlin Museum. Magnified three diameters; the actual diameter is 9 mm. and the length 5.5 mm.



FIG. 1.—PREDYNASTIC BEAD: NAQADA. ( $\frac{1}{3}$ )

Neuman and Kotiga state in *Zeitschrift für Angewandte Chemie*, 3/9/25, that Rathgen has tested a chip of this bead and that it is an undoubted glass. The colour is pale green. From a photograph of the beads associated with it I doubt its being as early as Predynastic. One of the other beads is evidently VIth dynasty or First Intermediate. This is not surprising as there were a number of graves of the VIth dynasty at Naqada. I think that this bead is also VIth dynasty and that it belongs to the same group as nos. 10 to 16. There seems no doubt, however, that this specimen is glass, and that it dates from at least as early as 2500 B.C.

## No. 3.

Description: Beads.

Found by MacIver and Mace at

Material: Glass.

Abydos, Egypt.

Date claimed: Predynastic 4000-3500 B.C. Now in (?)

Reference: D. R. MacIver and A. C. Mace, *El Amrah and Abydos*, 1902.

MacIver says: "Q44. Body of a young person, lying as usual in a contracted position, with the head at south. Necklace of green, blue and yellow glass beads. Pot B 18b. This was a shallow round grave of typical early prehistoric kind. There was no suspicion of a mixture with a later period, nor were there any graves of other sorts in the immediate vicinity."

I do not know where these beads are now. From this report there seems little doubt that they are made of glass, but I hesitate to date them as Predynastic until further evidence can be brought forward to prove it. They are the only evidence that I can find of glass in Egypt before the VIth dynasty. If these really are so early, it is very surprising that there should be a "necklace" of beads of three kinds of glass, green, blue, and yellow, whilst in all the other cases before the XIth dynasty, where early Egyptian glass beads have been reported, only single specimens have been found in each grave.

## No. 4.

Description: Pieces of inlay.

Found by Amélineau at Abydos,  
Egypt.

Material: Glass (?).

Date claimed: 1st Dynasty 3500-3000 B.C. Now in Ashmolean Museum, Oxford.

The Keeper of the Ashmolean, Dr. Leeds, and Mr. Harden have very carefully examined these specimens and are quite certain that they are faience and not glass. Under these circumstances it is not necessary to discuss the date.

## No. 5.

Description: Bracelet.

Found by Sir W. Flinders Petrie at  
Abydos.

Material: Glass (?).

Date claimed: 1st Dynasty 3500-3250 B.C. Now in Cairo Museum.

Reference: E. Vernier, *Catalogue Général du Musée du Caire*, 1908.

This bracelet was found on the arm of the Queen of King Zer. Vernier describes it as glass, but most of the people who have actually handled it are quite convinced that it is turquoise. Messrs. Lucas and Brunton have recently examined it again and confirm this diagnosis, so I am leaving it out from further consideration as probably not being glass.

## No. 6.

Description: Eye Beads.

Found by Andrae at Fara.

Material: Coloured glass (?).

Now in Berlin Museum.

Date claimed: Before 3000 B.C.

Reference: Koldewey in his book on excavations in Babylon stated that multiple coloured glass beads had been discovered at Fara, and that they must date back to before 3000 B.C. Dr. Andrae now informs me that there are not any early glass beads from Fara, all the specimens being rock crystal.

## No. 7. (Figs. 2 and 3).

Description: Cylinder.

Found by the Iraq Expedition of the

Made of: Pale green glass.

Oriental Institute of the Univer-

Date claimed: Akkadian 2700-2500 B.C.

sity of Chicago at Tell Asmar.

Now in the University of Chicago.

Reference: Third Preliminary Report, Oriental Institute Communications,  
No. 17. Chicago, 1934.

This specimen is a cylinder or rod of glass of pale blue-green colour. It was broken at both ends at an early date, and has recently been broken along one side. With the exception of the small bead in the Berlin Museum (No. 2), this is the earliest piece of clear glass known. The diameter is about .45 in. and the length 1.33 in. In the photograph of it (fig. 2), it is magnified 3 diameters. The



FIG. 2.—GLASS CYLINDER: TELL ASMAR.

FIG. 3. ( $\times 500$ )

weight is 6.332 grammes, the specific gravity 2.463, and the refractive index approximately 1.515.

The fact that this glass dates to about 2600 B.C. is very surprising. Clear blue glass of a very similar colour has been found in the Mediterranean area, but it shows a much heavier corrosion and is not older than 1000 to 800 B.C. Glass of a deeper blue, also very corroded, is found in Crete and dated to 1400 B.C.

This specimen was modelled or moulded into shape, and not cut out of a solid block. The glass is very pure, with a few small bubbles, but it is surprisingly free from striae or inclusions of quartz fragments or dirt. The colouring-matter is in the form of small spherical particles which have a slightly blue appearance when seen together in light reflected from above. These particles are in layers, the majority in the same layer being fairly uniform in size; but those in different layers vary greatly in size. The largest particles are about  $1/5000$  of an inch, whilst some of the layers consist chiefly of particles of about  $1/25000$  inch.

After carefully examining their appearance under different conditions, I think that there is no doubt that they are spherical and transparent and have a slightly different refractive index from the glass base.

Fig. 3 shows a portion of a small chip magnified 500 diam.; the majority of the particles shown as white discs in this figure have a diam. of about  $1/25000$  in.

Dr. Frankfort, the director of the excavations, has just written to me about the date of this specimen. He says: "There cannot be the slightest doubt about the date of our glass cylinder now. It was found in rubbish of Akkadian date (Sargon of Akkad between 2600 and 2500 B.C.), and it was at a lower level than the very foundations of walls which were built during the third dynasty of Ur on the top of that rubbish and covered over in their turn by houses of the Larsa period. There was no disturbance as a result of drains in this part either."

No. 8. (Figs. 4 and 5).

Description: Block of glass

Found by H. R. Hall at Abu Shahrein,

Material: Blue glass.

Iraq.

Date claimed: 2700-2600 B.C.

Now in British Museum (No. 115474).

This block of glass is very full of bubbles, but is otherwise a pure glass. The





FIG. 4.—BLUE GLASS : ABU SHAHREIN.

FIG. 5. ( $\times 100$ )

colouring matter is held in particles which vary greatly in size. Fig. 5 shows some chips magnified 100 diameters, whilst fig. 4 is a photograph of the complete block, natural size.

This specimen may have been meant to be carved or to be remelted and moulded to the desired shape ; or even, it may have been intended to grind it up and use it as a glaze. In any case it was probably a manufacturer's piece of material, and the probability is that it was made in the immediate neighbourhood of where it was found. This is the earliest suggestion of a glass factory that is known.

FIG. 6.—BRACELET : BAMPUR. ( $\times 2$ )

No. 9. (Fig. 6).

Description : Bracelets.

Material : Glass.

Date claimed : Before 3000 B.C.

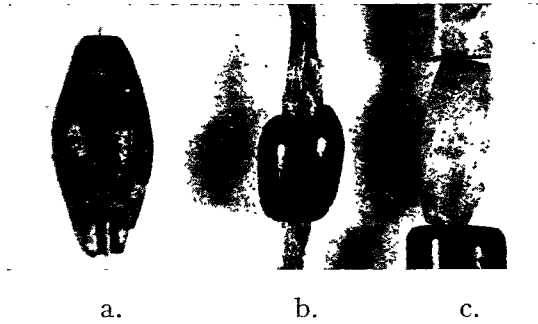
Found by Sir Aurel Stein at Bampur,  
Persian Baluchistān.

Now in British Museum.

These fragments of bracelets were found by Sir Aurel Stein at the bottom of a trench where they were associated with early painted pottery. They show a very advanced technique and are made of eight different kinds of glass. They are exactly similar to fragments found lying on the surface of the mound ; and almost identical bracelets are being made in India at the present day.

Glass bracelets have been found in Europe which date to as early as 500 B.C., but they are not quite similar.

I think that the probability is that these fragments had for some reason

FIG. 7.—BEADS : QAU. ( $\times 3$ )FIG. 8. ( $\times 100$ )FIG. 9. ( $\times 100$ )

been buried at a great depth, or else that they worked down whilst the excavations were being carried out.

Sir Aurel Stein, however, does not doubt their great age. I hope that further discoveries will settle this question as to date, as, if these bracelets prove to belong to this early period, they will be very important and will throw fresh light on the problem of the origin of glass. But until there is further proof, I am not prepared to accept for them any date which would bring them within the range of this paper, namely, prior to 1500 B.C.

No. 10. (Figs. 7a, 8).

Description : Bead.

Found by Brunton at Qau (23/1147),

Material : Turquoise glass.

Egypt.

Date claimed : VIIth to VIIIth Dynasty, Now in Beck Collection.

2600–2500 B.C.

Reference : G. Brunton, *Qau and Badari II*.

Microscopic examination of a chip of this glass shows that it is a turquoise blue variety, but it is rather impure.

The colouring matter is in very minute spots, very closely packed together. In a fracture through the bead it can be seen that the centre is blue, but that for some distance from the surface it has corroded to a yellow colour. In this it resembles some of the faience beads from Harappa (Indus Civilisation).

A general view of the bead magnified three diameters is shown in fig. 7a, whilst in fig. 8 some chips are magnified 100 diameters.

In this list, nos. 10 to 16, inclusive, are all small beads found by Brunton at Qau in graves of the First Intermediate period. I have only examined nos. 10 and 16: these are both glass and there is no reason to doubt their date. The only one that has been questioned is no. 14; as this is a red glass, Brunton thinks that it may be an intrusion. With this possible exception, I think that these beads can all be accepted as glass of the period.

It is an interesting fact that in no grave was more than one glass bead found, which suggests that they were valuable and only procurable in small numbers.

#### No. 11.

Description: Annular bead.

Found by Brunton at Qau (612), Egypt.

Material: Green glass.

Date claimed: VIth Dynasty, 2600–  
2500 B.C.

There is no reason to doubt either the material or date of this specimen.

#### No. 12.

Description: Bead.

Found by Brunton at Qau (589),  
Egypt.

Material: Green glass.

Date claimed: VIIth to VIIIth Dynasty. Now at Manchester.

There seems no reason to doubt either the material or date of this specimen

#### No. 13.

Description: Bead.

Found by Brunton at Qau, (4997),  
Egypt.

Material: Glass.

Date claimed: VIIth to VIIIth Dynasty. Now in University College, London.

There is no reason to doubt either the material or date of this specimen.

#### No. 14.

Description: Bead.

Found by Brunton at Qau (1521),  
Egypt.

Material: Red glass.

Date claimed: IXth to Xth Dynasty. Now at Manchester.

Reference: Brunton, *Qau and Badari II*.

Brunton thinks that this bead is an intrusion as it is made of a transparent red glass. We have no certain knowledge of such glass until a much later period but I think it possible that this specimen may prove to be of the date claimed.

There is no doubt that this bead is glass, but as the date is not certain, I class it provisionally amongst the doubtful specimens.

#### No. 15.

Description: Annular bead.

Found by Brunton at Qau, (1602),  
Egypt.

Material: Bluish glass.

Date claimed: IXth to Xth Dynasty. Now in University College, London.

There is no reason to doubt either the material or date of this specimen.

#### No. 16. (Figs. 7b, 9).

Description: Bead.

Found by Brunton at Qau.

Material: Green glass.

Date claimed: IXth to Xth Dynasty. Now in Beck Collection.

Reference: Brunton, *Qau and Badari II*.

Fig. 7b shows this specimen magnified three diameters, and fig. 9 a chip magnified 100 diameters. The latter shows some large particles which are mostly impurities; the very minute spots which contain the colouring matter do not appear as they are so small that they can scarcely be resolved with an oil immersion lens with an aperture of 1.2 N.A.

This specimen is undoubtedly glass, and there seems no reason to doubt its date.

## No. 17. (Figs. 10, 11).

Description : Lion's head.

Found by Drovetti at Thebes, Egypt.

Material : Blue glass.

Date claimed : XI Dynasty, 2400 B.C. Now in British Museum (No. 59619).

Reference : Nesbitt, *Glass: South Kensington Museum Art Handbook*.FIG. 10.—LION'S HEAD :  
THEBES. (†)

FIG. 11. (×400)

On this specimen is inscribed the name of Intef Nubkheperre.

This very important piece has a relatively modern chip on it, which enables the structure of the interior to be examined. I consider it is quite definitely a glass in which all the ingredients have not entirely melted, so that it has a large number of very small pieces of quartz in it. Very few of these pieces are more than .0007 in maximum dimension, and most of them are a great deal smaller.

As I was a little doubtful whether this effect was caused by insufficient firing, I mixed some ingredients in a small crucible and after they had been melted for quite a short time I allowed it to cool. On examining a chip from this under the microscope, I found exactly the same structure as no. 17, showing many small pieces of quartz.

I see no reason to doubt the date of this specimen. It is work of a very high class in the style of the early Middle Kingdom.

The illustration (fig. 10) is taken from Nesbitt's woodcuts, published in 1878. It is approximately the natural size.

In fig. 11 is shown a minute chip magnified 400 diameters. Some of the dark spots are colouring matter, but most of them are impurities. A considerable amount of the colouring material appears to be in ultra-microscopic particles.

## No. 18.

Description : Beads.

Found by Winlock at Deir el Bahri.

Material : Glass.

Date claimed : XIth Dynasty, 2400–2200 B.C.

Now in Museum of Art, New York.

Reference : *Bulletin of the Metropolitan Museum of New York*, 1921, Part 2.

I have not seen these specimens personally, but from the report of them there seems to be no reason to doubt that they are glass and of the date claimed.

## No. 19. (Fig. 12.)

Description : Mosaic of a bull.

Found by A. de Morgan at Dahshur, Egypt.

Material : Glass (?).

Date claimed : XIIth Dynasty.

Now in Cairo Museum.

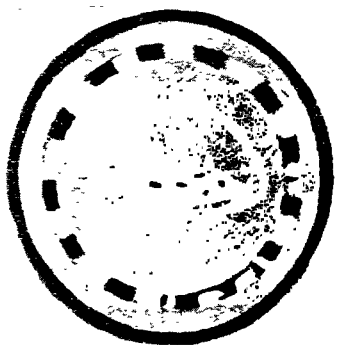


FIG. 12.—MOSAIC: DAHSHUR. ( $\times 2$ ) FIG. 13.—ROD WITH CARTOUCHE. ( $\times 1\frac{1}{2}$ )

Reference: de Morgan, *Fouilles à Dahshur*, vol. II, pl. 12, no. 62; p. 67

This specimen has caused more controversy than any other piece of reputed early glass. Dr. Lucas and Mr. Brunton are both convinced that it is not glass, but a stone mosaic. Professor Newberry, on the other hand, thinks that it is glass. He also considers that the question of its material cannot be finally settled until the piece of quartz which covers it is removed. The authorities, however, will not allow this to be done.

Fig. 12 is taken from a water-colour sketch made for Professor Newberry by Mr. Harold Jones. It is twice the size of the original.

With the exception of no. 21, no piece of mosaic glass of at all a similar nature has been reported until at least 1500 years later.

I have not seen this specimen myself, but as there are such very divergent opinions concerning it, I class it as doubtful.

#### No. 20.

Description: Fragment of yellow glass. Found by de Morgan at Dahshur,

Material: Glass. tomb of Khunumuit.

Date claimed: XIIth Dynasty, 2100 B.C. Now in Cairo Museum.

Reference: Parodi, (?).

Dr. Lucas says that this has been analysed by Parodi and is glass, but he does not think it came from the tomb referred to as all the other articles from the tomb are in the Cairo Museum and they do not at all resemble the piece analysed by H. D. Parodi. *La Verrerie en Égypte*, Cairo, 1908.

Under these circumstances I include this amongst the doubtful specimens.

#### No. 21. (Fig. 13.)

Description: Glass rod with cartouche of Amenemhat III. Now in Berlin Museum.

Material: Glass.

Date claimed: 2050 to 2000 B.C.

References: P. J. Newberry, *Glass Chalice of Thotmes III*, J.E.A., Vol. VI, p. 159, 1920. A. Lucas, *Ancient Egyptian Materials*.

There seems no doubt that this important piece of glass is of the date stated.

This is the only piece of glass mosaic, with the possible exception of the Dahshur bull (no. 19), that can be attributed to this early period. It is an astonishing find, as, except for these pieces, the method does not seem to have been employed until 1500 years later.

#### No. 22. (Fig. 7c.)

Description: Bead.

Found by de Morgan at Dahshur, Egypt.

Material: Turquoise glass.

Date claimed: XIIth Dynasty, 2100 B.C. Now in Beck Collection B/951.

This looks like a turquoise, but a scratch from it when examined under a microscope with polarized light is quite isotropic, showing that it is a true glass. This bead is shown three times natural size in fig. 7c.

## No. 23.

Description : Fragments of a bead. Found by Woolley at Ur.  
Material : Glass. Now in Beck collection B'1347 ;  
Date claimed : Larsa period, c. 2100 B.C. micro. slide 859.

This specimen is undoubtedly of glass, but it is very corroded. Originally it was a transparent blue glass. The specimen has a large nodule of metal, apparently copper, sticking out on the fractured surface. From this nodule runs a line of deep blue glass.

A microscope slide shows conchoidal fractures almost like cleavage planes.

The date of this bead fragment is not certain, but it was associated with beads which are identical with those of the Larsa Period ; unfortunately, however, Mesopotamian beads often continued to be made the same shape for many centuries. It would not be very surprising if this bead does date from the Larsa Period, as the material is very similar to that of the glass cylinder (no. 7).

These fragments were found at the south end of DD.

Although I think that this bead is probably of the Larsa Period, I do not think that the proof is certain, and I class it as a doubtful specimen.

## No. 24.

Description : Bead. Found by (?) at Dolmen à Graille,  
Material : Purple glass. Gard, France.  
Date claimed : Early Copper Age, Now in Toulouse Museum.  
c. 2000 B.C.

This specimen looked like a piece of metal when seen through the glass of the showcase, but when handled proved to be a piece of purple glass.

I see no reason to doubt either the material or age of this specimen.

## No. 25.

Description : Glass disc. Found by (?) at (?) .  
Material : Green glass.  
Date claimed : XIIIth Dynasty, 2000- Now in British Museum (?).  
1950 B.C.

This specimen was shown to me some years ago by Dr. Hall. It was in very good condition. I think that he said that he had just acquired it for the museum, but I am not certain. There seemed no absolute proof of its date, but it had a name moulded on it which Dr. Hall thought pointed to its belonging to the XIIIth dynasty.

The Egyptian Department at the British Museum is unfortunately in a rather chaotic condition as the floors are being rebuilt. Most of the collection is packed away, but the Keeper of the Department has promised to look for it when the collections are being rearranged.

## No. 26.

Description : Beads. Found by (?) at Assur under the  
Material : Glass. Ziggurat.  
Date claimed : 1800 B.C. Now in Berlin Museum.

Reference : *Mitteilungen der deutschen Orient-Gesellschaft*, no. 54, S 47/48.

## No. 27.

Description : Beads. Found by S. Smith and Woolley  
Material : Red glass. at Ur.  
Date claimed : Before 1600 B.C. Now in British Museum (No. 116582).

These are a series of red beads of which the first were discovered in 1925. They were in a layer which dated to before 1600 B.C. There are two varieties, one a very brilliant red and the other a darker red. Every year a few of the brilliant red specimens are found, but not associated with any tomb or dateable layer.

These brilliant red beads show no signs of corrosion and are probably quite modern and came from the local bazaar. The dark red beads show slight signs of wear, but I expect these also are modern.

The excavators when on the spot endeavoured to find some explanation as to how the beads got there. They did not see any means by which modern beads could have been put there, and they did not consider that it was worth anyone's while to have taken great trouble to insert them. On the other hand, some of the bright red beads are identical with some of the beads on showcards from Czecho-Slovakia.

There are a few larger red beads found on the site which are not dated, but which I think are of the Roman Period. These have some resemblance to the darker red beads referred to.

Until further and quite definite proof is forthcoming that any of these beads are early, I shall consider them all as quite modern.

No. 28.

Description: Fragments of beads.

Found by Woolley at Ur.

Material: Glass.

Date claimed: Before 1600 B.C.

Now in Beck Collection.

These fragments are almost reduced to dust. They were found with a series of faience beads definitely stated by Woolley to date before 1600 B.C. The dust consists largely of broken down glass which has almost entirely corroded away. It is, however, definitely glass of at least two sorts, one practically colourless, the other the yellow glass so common in Egypt during the XVIIIth dynasty.

If glass of this sort was being used extensively in Mesopotamia before 1600 B.C., it might explain the sudden appearance of glass in Egypt during the XVIIIth dynasty.

Also associated with the beads of this period and even earlier periods are the little carnelian seed-vessel amulets, which are unknown in Egypt before the XVIIIth dynasty, but became one of the favourite amulets during that period.

Amongst the dated glass beads of the Neo-Babylonian period (about 700 B.C.) are a number of yellow glass beads of the same type and material. These are in a very good state of preservation. From undated sites come a number of similar beads which are so completely corroded that they have lost their colour and both yellow and black glass have become an opalescent grey. Are these of the period before 1600 B.C.? There is no evidence to prove this at present.

I think that the evidence that these bead fragments date before 1500 B.C. is sufficient to allow me to include them as coming within the scope of this paper.

By examining these particulars, and neglecting nos. 4, 5, and 6 as not being glass, nos. 9, 20, and 27 as being of more recent date, and nos. 1, 14, 19, 23, and 25 as doubtful, we find that 17 specimens remain, of which very little doubt is possible. Of these, 13 are beads and 4 larger objects. If we examine the beads first we find that 10 are Egyptian, 2 are Mesopotamian, and 1 is French. Of the Egyptian specimens recorded all are single beads with the exception of nos. 3 and 18; whilst the two examples from Mesopotamia refer to considerable numbers.

Of the four larger specimens 2 come from Egypt and 2 from Mesopotamia. The two earliest are from Mesopotamia; they are of importance when considering from which country glass originally came.

The most important piece of evidence is the block of glass from Abu Shahrein (no. 8). This is evidently a manufacturer's piece of material which was going to have more work put into it, either by carving or reheating, or else it was going to be discarded as unsatisfactory. In either case it was probably at or near the factory where it had been made or was going to be completed. This very strongly suggests that a factory existed in Mesopotamia 1000 years earlier than there is any sign of one in Egypt.

The glass cylinder (no. 7) from Tel Asmar is, with the exception of the small bead no. 2, the only specimen of clear glass reported as being made before 1500 B.C.

Both these pieces (nos. 7 and 8) point very strongly to Mesopotamia as the country where glass originated.

The two Egyptian specimens of early glass, although they cannot claim to be the earliest, can certainly claim to be the most beautiful. The small lion head now in the British Museum (no. 17) is a masterpiece of carving in a very difficult material, whilst the rod with the cartouche (no. 21) is an astonishing piece of moulding to have been done at such an early date.

The fact that there are comparatively few instances of early beads being reported from Mesopotamia might be considered as evidence against a Mesopotamian origin, but one would expect to find fewer beads from Mesopotamia for two reasons. Firstly, the soil is so corrosive that it is surprising that any specimens should have lasted at all; and, secondly, there has been such a much larger amount of excavation carried out in Egypt than in Mesopotamia. Also the difference in the finds from the two countries is not great; eight of the Egyptian specimens reported were individual beads.

Another sign that glass may have originated in Mesopotamia is the fact that the typical yellow glass of the XVIIIth dynasty of Egypt seems to occur in Mesopotamia at an earlier date.

Professor Newberry has kindly informed me that as early as 2300-2200 B.C., it is definitely stated, glass was called *thnt*, and was imported from *Thnnw* land, i.e., the country to the west of Egypt.

Whilst this evidence is far from conclusive, I think it points to the probability of glass having originated in Mesopotamia and not in Egypt.

In this consideration of origin I have not taken notice of the glass bracelets discovered by Sir Aurel Stein (no. 9), as I doubt their date. If further exploration proves that he is right, and that these date back to the third millenium B.C. or even earlier, the question as to whether Persian Baluchistān was the country of origin will have to be considered.

From the foregoing it appears that the introduction of glass into both Egypt and Mesopotamia is at least as early as 2600-2500 B.C., but I do not think that the evidence of the necklace in no. 3 is sufficiently strong to take it back nearly 1000 years to the Predynastic period, until some further evidence is available.

Another fact which is of great interest but which may not have any real bearing on the matter is that the earliest documentary evidence which we have of the methods of manufacture of various kinds of glass comes from the Assyrians. It is a series of tablets written on the subject during the reign of Ashurbanipal. These tablets, which date to 668-626 B.C., are very possibly copies of earlier



ones. They are unfortunately broken in places, but Dr. Campbell Thompson has made a very interesting translation of them.<sup>1</sup> This was especially difficult, as there is a doubt how to translate the names of many of the chemicals employed. I will conclude this paper by quoting some of this early and important document.

The formulae given must have some governing factor which is not clear, as the proportions of colouring matter given are in some cases far too great to be practicable. For instance, one glass said to be purple is said to have 75% manganese, whereas 3% is the maximum possible. (Dr. Campbell Thompson suggests that manganese may be an incorrect translation.) But in spite of this they give us an insight into many of the materials used for colouring matter, and although one or two may be doubtful many of them are certain.

In almost all cases the silica is mixed with alkali and lime. The following chemicals are stated to have been used to make various coloured glasses. For black (?) glass ferric oxide and copper were used, and the same materials were also used for brown glass. Blue glass had copper, purple glass had manganese, and a red purple seems to have no colouring matter stated, but started with a blue frit. Green glass contained oxide of tin and saltpetre, yellow glass antimony and saltpetre; opaque carnelian and alabaster had oxide of tin; aventurine or spangled red glass ferric oxide (?), saltpetre, and arsenic; whilst a glass called coral contained tin, antimony, saltpetre, and gold. Dr. Thompson is not absolutely certain as to the translation of ferric oxide, oxide of tin, or saltpetre, but he gives very good reasons why he thinks they are correct.

The mention of gold for making a pale red glass is of great interest as it was a tradition amongst the alchemists that gold could be used for this purpose, although they were not successful in so using it until the seventeenth century.

The manufacture of glass was thought by the Assyrians to be very closely allied to magic and it was considered necessary to start the fires on a propitious day. There is little doubt that the meltings of glass sometimes turned out very badly. The makers thought that this was due to magic and was controlled by the Beings who overlooked the partly made objects and watched their development. Consequently, definite rules were laid down as to the proper method to start a glass furnace. These are given on the first tablet and translated by Dr. Campbell Thompson as follows (*op. cit.*, p. 57).

“When thou settest out the (ground) plan of a furnace for ‘minerals,’ thou shalt seek out a favourable day in a fortunate month, and thou shalt set out the (ground) plan of the furnace: while they are making the furnace thou shalt watch (them) and shalt work thyself (?). In the house of the furnace thou shalt bring in embryos (born before their time) . . . another (?), a stranger, shall not enter, nor shall one that is unclean tread before them: thou shalt offer the due libations before them: the day when [thou puttest down] the ‘mineral’ into the furnace thou shalt make a sacrifice before the embryos: thou shalt set a censer of pine-incense, thou shalt pour ‘kurunnu’ over before them.

“Thou shalt kindle a fire underneath the furnace and shalt put down the mineral into the furnace. The men whom thou shalt bring to be over the furnace shall cleanse themselves, and (then) thou let them come down to the furnace.

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<sup>1</sup> R. Campbell Thompson, *The Chemistry of the Ancient Assyrians*. Luzac and Co.

"The wood which thou shalt burn underneath the furnace shall be styrax, thick, decorticated billets which have not lain (exposed) in bundles, (but) have been kept in leather thongs, cut in the month of Ab. This wood shall go underneath thy furnace."

In conclusion I wish to acknowledge my indebtedness to the British Museum; the Berlin State Museum, both the Egyptian and Near Asian departments; Dr. Frankfort, director of the Iraq expedition of the Oriental Institute of the University of Chicago; Mr. Brunton; Mr. Harden; Dr. Leeds; Mr. Lucas; Prof. Newberry; Dr. Campbell Thompson; and to Mr. Woolley, for assistance in various ways

H. C. BECK.

# AN EGYPTIAN LOAN-WORD AT RAS SHAMRA.

IN ANCIENT EGYPT, 1932, p. 105, I discussed a passage in the recently published Semitic epic from Ras Shamra, describing the defeat of Mot, god of summer drought, by the war-goddess Anat. The passage runs:—

"She removes his robe;  
She places the *hptr* upon a fire,  
The *hprš* upon glowing coals."  
(Second Tablet, Col. II, 4 ff.)

I suggested that the baffling *hprš* was the Egyptian *khepresh*—crown, ultimately deriving from Anatolia, but the word *hptr* remained a puzzle. A solution has now occurred to me. The signs read separately as *pt* when joined together form the letter *k*. The word will therefore be *hkr*, which could be yet another loan-word from the Egyptian, equating with *hkr*, "adornment, insignia," thus balancing *hprš*.

Considering that the administration of Ras Shamra (Ugarit) was long in Egyptian hands, it is natural that the words describing regal garb should be borrowed from the Egyptian.

THEODOR HERZL GASTER.

# AN EGYPTIAN LOAN-WORD IN A TELL-AMARNA LETTER.


IN the Tell-Amarna letter, British Museum 29, 11-12<sup>2</sup>, the following address is made by Abi-milki, governor of Tyre, to the Egyptian Pharaoh:—

*ša it-ta-za-ab gab-bi mātā-ti*  
*ina pa-ša-ḥi i-na du-ni imitti ḥa-ab-ši*

"who delivereth all lands

by pacifying (them) by the strength of (his) right hand,—by (his) *ḥabšu*."

The word *ḥa-ab-ši* is marked by the slanting wedge indicating that it is a foreign word, of which *du-ni imitti* (by the strength of his right hand) is an explanation.

I suggest that it is the Egyptian *ḥps* , the sickle-sword which was *xxʽ ʕꜥꜥꜥꜥ*, the weapon of the Pharaoh. *Du-ni imitti* is a rough gloss, giving the general sense.

THEODOR HERZL GASTER.

## EGYPTIAN AND GREEK STATUETTES FROM NAUCRATIS.

AMONG the numerous dedications found in the excavations at Naucratis in 1885-1886 there were many statuettes, some purely Egyptian in style, others showing such a mixture of Greek and Egyptian types as we might expect to find in a Greek colony upon Egyptian soil. Not that such examples are found exclusively in Egypt. On many Greek sites where dedications of the sixth century B.C. or earlier have been found, this curious mixed style may be seen—for instance, in Cyprus and Rhodes. In this connection it is instructive to quote the story told by Polycharmis, himself a citizen of Naucratis, and quoted from him by the Naucratis writer, Athenaeus.<sup>1</sup> The story is quoted at length in *Naucratis II*, p. 55, but is so relevant that it seems worth repeating here as follows:—

“ In the twenty-third Olympiad Herostratus, a fellow citizen of ours, was on a journey; and having sailed round many lands, he touched also at Paphos in Cyprus; there he bought a statuette of Aphrodite, a span high, of archaic style, and went off with it to Naucratis. Now, when the ship was near Egypt, a storm suddenly came on, and they could not see whereabouts they were; so all of them took refuge by the image of Aphrodite, praying her to save them. And the goddess, with her wonted favour to the people of Naucratis, suddenly



EGYPTIAN KING OF XXVIth DYNASTY.



GREEK STATUETTE FROM NAUCRATIS.

filled all the region about her with green myrtle, and made the ship full of the sweetest odour, when the crew had now given up hope in their severe sickness. They at once vomited freely, and the sun shone forth ; so they made out their landmarks and reached Naucratis. Then Herostratus, rushing from the ship with the image, and also with the green myrtle boughs that had suddenly come forth, dedicated them in the temple of Aphrodite. And, having sacrificed to the goddess and dedicated the image to Aphrodite, he called his friends and relations to a banquet in the temple itself, and gave to each of them also a garland of myrtle, to which he gave thereupon the name Naucratite."

This story is of peculiar interest to us because of its reference to an image, a span high, of archaic workmanship which was brought from Cyprus and dedicated in a Greek temple at Naucratis. The description would fit very well many of the figures, found in excavating these temples, which may be seen now in the British Museum or in the Edwards Library at University College. The two statuettes of which representations are here given side by side differ from the dedication of Herostratus in that they both are male figures ; but it was quite common for male figures to be dedicated to goddesses and for female figures to be dedicated to gods, as an act of worship or thanksgiving. The date given by Polycharmis to Herostratus, the twenty-third Olympiad (or 680 B.C.), is indeed earlier than the traditional date of the foundation of the Greek colony at Naucratis ; but small figures " of archaic style " may well have been bought and dedicated in the early days of Greek colonization.

The chief interest, however, of the two statuettes here represented lies in the comparison of their style and type. The one is purely Egyptian, and represents a king of the XXVIth dynasty. It is a glazed-ware figure, 8.5 cm. high, and shows the delicate and refined work characteristic of the period. It stands in a rigidly erect pose, the left leg advanced, and the space between the legs filled in so as to make the figure more stable ; the arms are fixed close to the sides ; on the head is a massive wig which is divided over the shoulders, and extends to the front of the chest. The drapery consists, as is often the case in Egyptian sculpture, of a kind of loin-cloth (Shendyt) suspended from a waist-belt ; it is divided into two sides, with a triangular pendant occupying the space between them.

The two figures are reproduced at approximately the same size, in order to facilitate comparison.

The Greek statuette is carved out of soft limestone, and is 28 cm. high. The pose is precisely the same as that of the Egyptian figure, with the left leg advanced and the space between the two legs filled in—or rather left in the stone—for support. The arms are fixed close to the sides, and the whole figure faces rigidly to the front. The bodily forms are vague and rounded. The hair is treated in a solid mass that hangs to the shoulders, but is evidently meant for hair and not for a wig. But it is above all in the arrangement and shape of the drapery that the two figures resemble each other. In the Greek figure, as in the Egyptian, this consists of a loin-cloth hanging from a belt ; the two sides are divided, and between them an approximately triangular flap hangs down. Now such a garment is unknown to Greek fashion or to Greek sculpture ; but it is common enough in Egypt. The obvious inference is that the Greek artist was making an almost mechanical copy from an Egyptian original, whether actually made in Naucratis or brought there in the course of commerce.

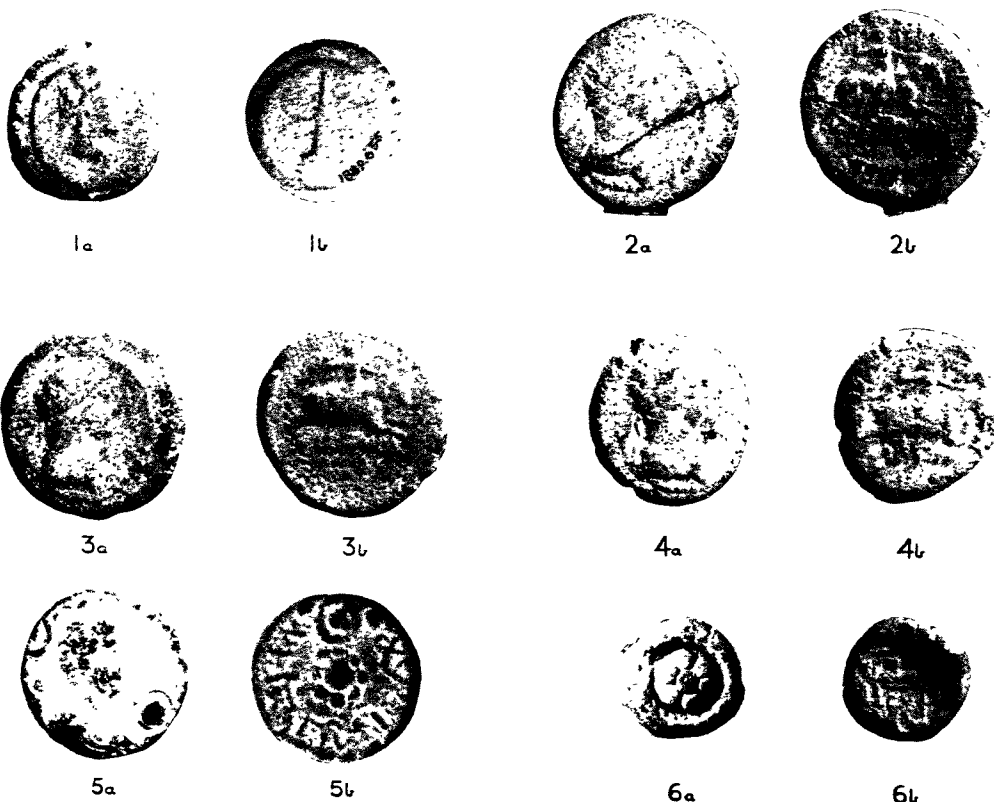
That such products of Graeco-Egyptian art should be found at Naucratis is appropriate ; for the Ionian Greeks who joined in the foundation of that

colony were also among the first to join in the great advance of Greek art. The Samian sculptors, Rhoecus and Theodorus, are said by Diodorus Siculus to have been trained in Egypt, and to have followed Egyptian conventions; their works resembled Egyptian models, having their arms close to their sides and their legs wide apart. Mrs. Mitchell, in her *History of Ancient Sculpture* (p. 199), notes that the island home of these Samian sculptors, "enriched by commerce, had its settlement in the Egyptian Naucratis." And since this was the only place in Egypt where Greeks were allowed to settle, it is most probable that Rhoecus and Theodorus lived there when they made their studies of Egyptian art. It is worth noting, perhaps as more than a coincidence, that the name of Rhoecus, ΡΟΙΧΟΣ, occurs in the incised inscription of dedication upon an Ionic "eye-bowl" found (*Naucratis I*, p. 59) in the temple of Aphrodite. He may even have made this offering to the goddess during his sojourn in the colony. In any case he may well have made statuettes, influenced by Egyptian sculpture, such as the one here represented. The name Theodorus also occurs on a vase-fragment in *Naucratis I*, xxxiv; but this cannot be insisted on, as it is a comparatively common name.

E. A. GARDNER.

<sup>1</sup> xv. 676.

*Local Currencies of East Syria under the Roman Empire.*



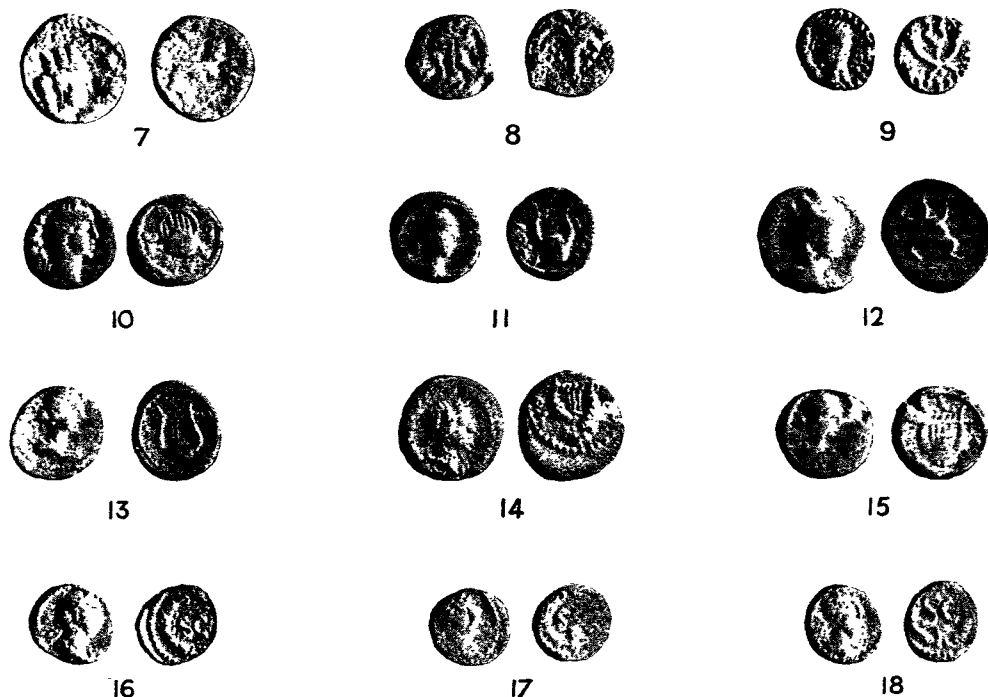
## LOCAL CURRENCIES OF EAST SYRIA UNDER THE ROMAN EMPIRE.

IN the collection of clay tesserae from Palmyra in the Ashmolean Museum there are several which resemble coins in their shape and general design ; and four are actual copies of bronze coins, of two types (nos. 1-4). The earlier of the originals used as models is an autonomous coin of Sidon, struck in the second quarter of the second century B.C., the types of which are a head of the city-goddess and a rudder : if the letter behind the head on the obverse is, as the traces suggest, meant for B, it corresponds to no. 87 in the British Museum Catalogue, *Phoenicia*, p. 155. Two of the other three tesserae are from the same moulds : the types of all three are those of no. 217, p. 179, in the same catalogue, a radiate bust of Trajan and Astarte seated on a bull, dated in year ZKΣ (=116/7 A.D.). The moulds appear to have been made by impressing a coin on an almost flat surface of plastic material, which was then hardened ; a lump of clay was placed between two moulds, squeezed flat, and baked.

It is difficult to see for what purpose these copies of coins were made, if it was not to serve the function of coins in trade ; and it would be natural enough, at Palmyra, for clay to be used for the manufacture of what might be called tokens, if the supply of metal coinage proved insufficient to meet the ordinary requirements of business in the local markets. Though, in the Greek and Roman world, the ordinary materials of coinage were gold, silver, and bronze, substitutes for these were not unknown ; base-metal copies of silver and bronze coins are found, some of which may be fraudulent, but others were probably issued to supplement the regular currency in emergencies : there is a record of leather having been used for this purpose, which there is no reason to question, although no specimens have been preserved. At Palmyra the most convenient material to replace metal would doubtless be clay, the employment of which for many purposes of business had been familiar in Mesopotamia from time immemorial ; when there was a shortage of bronze coinage in circulation, some of the pieces normally current, such as the Sidonian types mentioned, would be reproduced in clay, and these reproductions would be accepted as equivalent to the originals.

It is possible that not only the direct copies of official coins, but also others of the clay tesserae, were intended to be used in this way ; some (nos. 5, 6) are round disks, not unlike coins in shape, with devices moulded on both faces, which in their general appearance suggest coins, and might serve the purposes of exchange equally well as those which bore ordinary coin-types. It has been proposed to regard the commoner square or rectangular tesserae as monetary tokens, but this seems more doubtful ; to the Greek or Roman merchant a coin was a round object, and, though square coins are a regular feature of Indian currencies, it may be questioned whether Oriental influences would be strong enough at Palmyra to make tokens of this shape acceptable.

Apart from their material, however, these clay tesserae were decidedly more attractive objects than the metallic small change which was in use at Palmyra in the period when its trade was most active. Large numbers of bronze coins are obtained at Palmyra ; but nearly all of these are miserable little things, crudely designed and roughly struck (nos. 7-9). It might have been expected that a city of the importance to which Palmyra had attained in the second and third centuries A.D. would have produced coins for local business purposes comparable to those of other Hellenized trade-centres ; gold and silver might have been imported, but bronze does not as a rule travel far. There can



be no doubt that these bits of bronze are the products of the Palmyrene mint ; very few bear even an attempt at a legend, and the execution is so bad that it is often difficult to decipher the types ; but there are two varieties which are inscribed with the name of Palmyra, and several which have as one of their types a palm-tree, presumably the badge of the city. For these at any rate the attribution may be taken as practically certain ; and most of the rest are so obviously of the same class that they may well belong to the same place.<sup>1</sup>

There is another group of coins which seems to belong to Syria, and may furnish a link between the Palmyrene issues and those of the more normal Greek style. These pieces are almost as small as the Palmyrene, but of rather better workmanship, and are definitely copies, on a reduced scale, of bronze coins of Antioch. Two specimens (nos. 10, 11) are of particular interest, as they come from the collection formed in Syria at the end of the seventeenth century by William Hallifax, chaplain of the Levant Company's factory at Aleppo, and one of the first Englishmen to visit Palmyra<sup>2</sup> ; it was bequeathed by him to Corpus Christi College, of which he had been a Fellow. The legends are blundered, but have some sort of reminiscence of their Antiochene prototypes : on the obverses is a laureate head, which should be the head of Apollo, but in no. 10 seems to have been assimilated to that of Antoninus Pius ; the reverses reproduce the lyre found on the "pseudo-autonomous" coins of Antioch. They may be compared with the two coins (nos. 13, 14) from the old Bodleian collection published by G. Macdonald (in *Num. Chron.*, 1904, p. 134), which similarly have the Apollo and lyre types, but on the reverse a date which appears to be **ZNC** (=208/9 A.D.) ; there is no attempt at a legend on the obverse.<sup>3</sup>

These types are borrowed from the series issued in the name of the city of Antioch ; but there are also copies, reduced to about the same size, of the larger bronze coins struck at Antioch with the heads of emperors on the obverse and SC on the reverse (nos. 16-18). The heads are not always recognizable, and there are no legends ; one is published in the British Museum Catalogue (*Galatia, Cappadocia, and Syria*, no. 290) as of Hadrian, and there are other apparent

attempts at a likeness of him ; one (no. 16) is definitely Trajan, and two or three may be meant for Marcus Aurelius.

It seems probable that these little bronze pieces formed a substantial part of the small change used in Eastern Syria during the second and third centuries, supplemented at Palmyra by the clay tesserae mentioned earlier in the account. The originals copied are almost all of the second century, and some of the better reproductions may have been practically contemporary ; the more degraded ones are presumably later. Their issue is not likely to have continued after the establishment of what was really an independent principality at Palmyra by Odenathus in the second half of the third century ; his son Vaballathus struck coins on the model of the Roman currency.<sup>4</sup>

Parallel developments may be found in other frontier provinces of the Roman Empire, particularly in Egypt. Here, after about A.D. 170, the issue of bronze from the Imperial mint at Alexandria dwindled rapidly, and in half a century virtually ceased ; the only later Alexandrian bronze coins belong to four special commemorative groups, which were medals rather than coins ; and for the greater part of the third century the only metallic small change used in Egypt consisted of leaden tokens, with types sometimes borrowed from the Imperial coinage, sometimes of more local connection. These leaden tokens are analogous to the Palmyrene clay tesserae. Later, in the fifth century, when the Alexandrian mint, which had been reformed by Diocletian, again decayed, the needs of the country for bronze currency were supplied by reduced copies of the Imperial types, very similar to those found in Syria in the third century ; they begin with fairly close imitations, but grow more and more barbarous.<sup>5</sup>

At the other end of the empire, in Britain, a practice of supplying deficiencies in currency with locally made copies of the official coins had started almost immediately after the Roman occupation of the island ; it was less in evidence in the second century than in the first, but became very common in the last part of the third ; under the Constantinian house it ceased, but revived again towards the end of the fourth century ; and from that time onwards practically the only currency of Britain consisted of degraded copies of Roman types, which steadily became smaller and cruder, till they were superseded by the coinage of the Anglo-Saxon kingdoms.<sup>6</sup>

J. G. MILNE.

#### NOTES.

1. See the introduction to the British Museum Catalogue, *Coins of Galatia, Cappadocia, and Syria*, pp. lv-lviii.

2. The visit of Hallifax to Palmyra was in 1691 : an account was published in the *Philosophical Transactions* for 1695 and republished in the *Journal of the Palestine Exploration Fund* for June, 1890. There is no mention of coins in this account, but the records at Corpus Christi College, and the general character of the collection, leave no room for doubt that Hallifax acquired nearly all his Greek coins during his residence at Aleppo. The C.C.C. coin cabinet is now deposited at the Ashmolean.

3. These two coins probably come from a large collection formed by Sir Charles Warren in Palestine and Syria, which he presented to the Bodleian.

4. See Mattingly and Sydenham, *Roman Imperial Coinage*, vol. 2, p. 585.

5. See *Ashmolean Museum Catalogue of Alexandrian Coins*, pp. xvi-xviii ; *Numismatic Chronicle*, 1926, pp. 43-92, and 1930, pp. 300-315.

6. See *Journal of Roman Studies*, 1933, pp. 221-222.



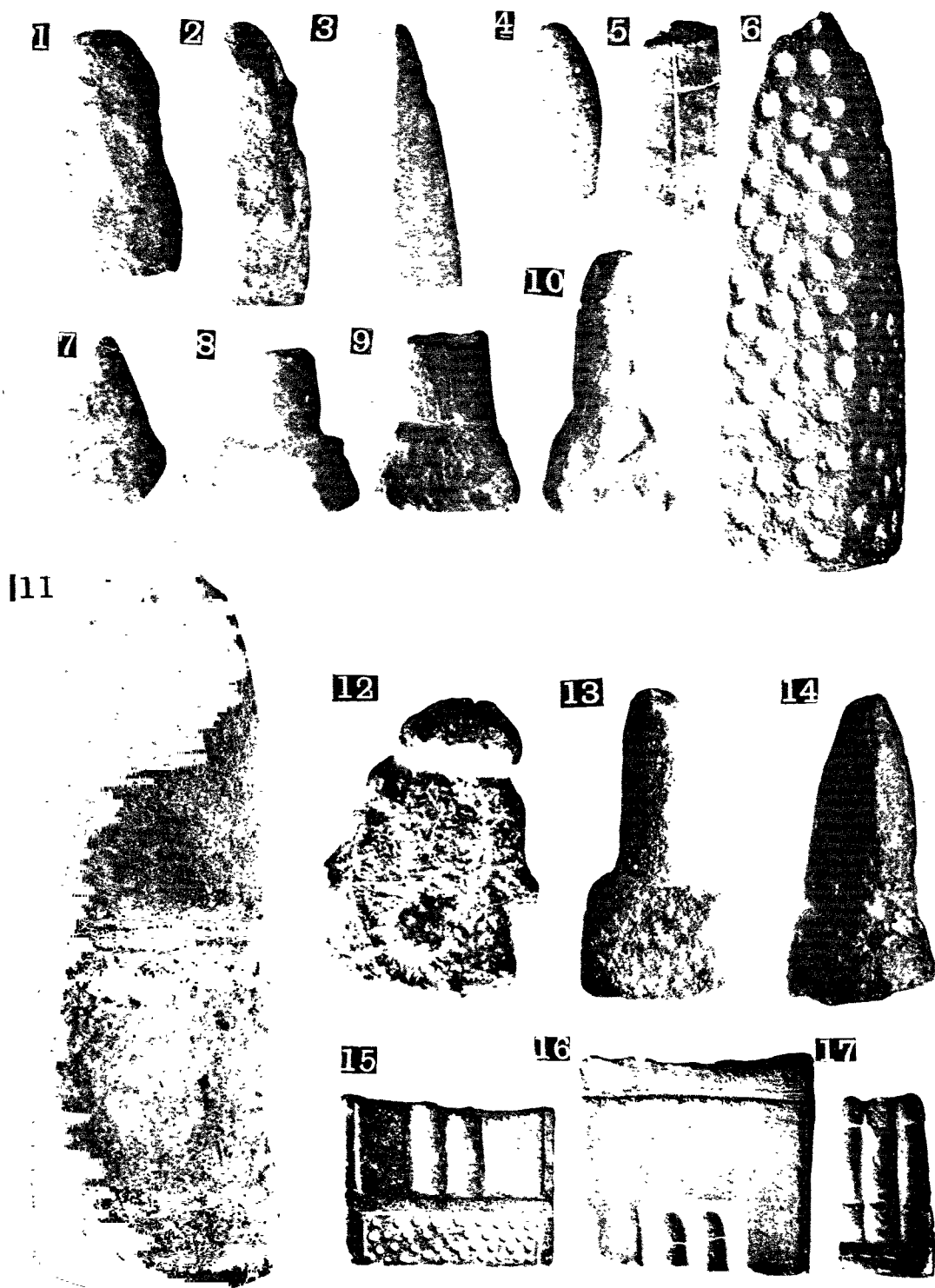


PLATE I.

## SACRED STONES IN ANCIENT MALTA.

THE sacred stones of Malta form an interesting group of monuments. They vary in size from the great stone, standing 4 ft. 7 in. high, which was once in the Gigantea of Gozo (pl. I, 11) down to the little votive offerings of which the smallest (pls. I, 7 ; II, 22) is barely an inch and a half in height.

These stones differ from the sacred pillars of Malta in being more or less circular in section and in being pointed or rounded at one end. Some stand on their own base, others are carved as if set on a stand. They never occur in miniature form to be used as amulets for personal adornment or protection, like the "waisted" or hour-glass pillar. They are found only in temples, never in tombs, showing that this was a cult for the living. As far as can be ascertained the Maltese sacred stones belong to the Neolithic period or at latest to the early Bronze-age, except at Borg en-Nadur where the worship continued till Graeco-Phoenician times. The sanctity of the emblem is indicated by the representation of one or more enclosed in a shrine (pl. I, 15-17). In these representations the phallic form of the object is more clearly seen than in the free-standing examples.

Usually there is no decoration, but in three instances the pitted ornamentation of the Neolithic period has been used (pls. I, 6, 10 ; II, 5, 6), showing thereby the date, which is also fixed by the layer in which the objects were found at Tarxien. The characteristic chevron pattern of the Bronze-age is found twice (pl. II, 14, 20). The vertical and horizontal lines on the broken example from Borg en-Nadur (pls. I, 5 ; II, 10) are found also on the anthropomorphic figure (pls. I, 12 ; II, 26).

Though female figures are common in Malta, no female emblems have been found, or at any rate have not been identified. There are no large or small objects, and above all no amulets, which can be definitely recognized as representations of the female. The cowrie occurs, but the proof that this shell was regarded by the primitive Mediterranean people as the female emblem is yet to seek. It is, however, possible that the phallic stone on a stand (pls. I, 8-10, 13, 14 ; II, 12-26) may represent the combination of the male and female, like the "Linga-Yoni" of India. This is merely a suggestion, for the Indian emblem appears foreign to the religion of Europe, where the worship of the phallus alone was deeply rooted.

The phallic emblem appears to have developed into a human form, at first very rudely executed but becoming more recognisable later. The transition can be traced. Pl. II, 6, shows a phallus with pitted decoration, and it is easy to see how by a little alteration it could be developed into no. 19. The front view of no. 19 is seen in pl. I, 12, where it is shown to be definitely phallic. The ornamental lines of no. 19 are of the same kind as on no. 10 in the same plate, which suggests that no. 10 was also iconic. The example from Mnajdra (pl. II, 11) is of pottery, and is certainly anthropomorphic though reminiscent of the more simple type.

The worship of the phallic stone continued in the south-east of Malta long after it had come to an end elsewhere. The temple of Borg en-Nadur, set above the only inlet on that formidable south coast, was dedicated to the ancient god of Tyre, Melkart, whom the Greeks called the Tyrian Herakles. This temple

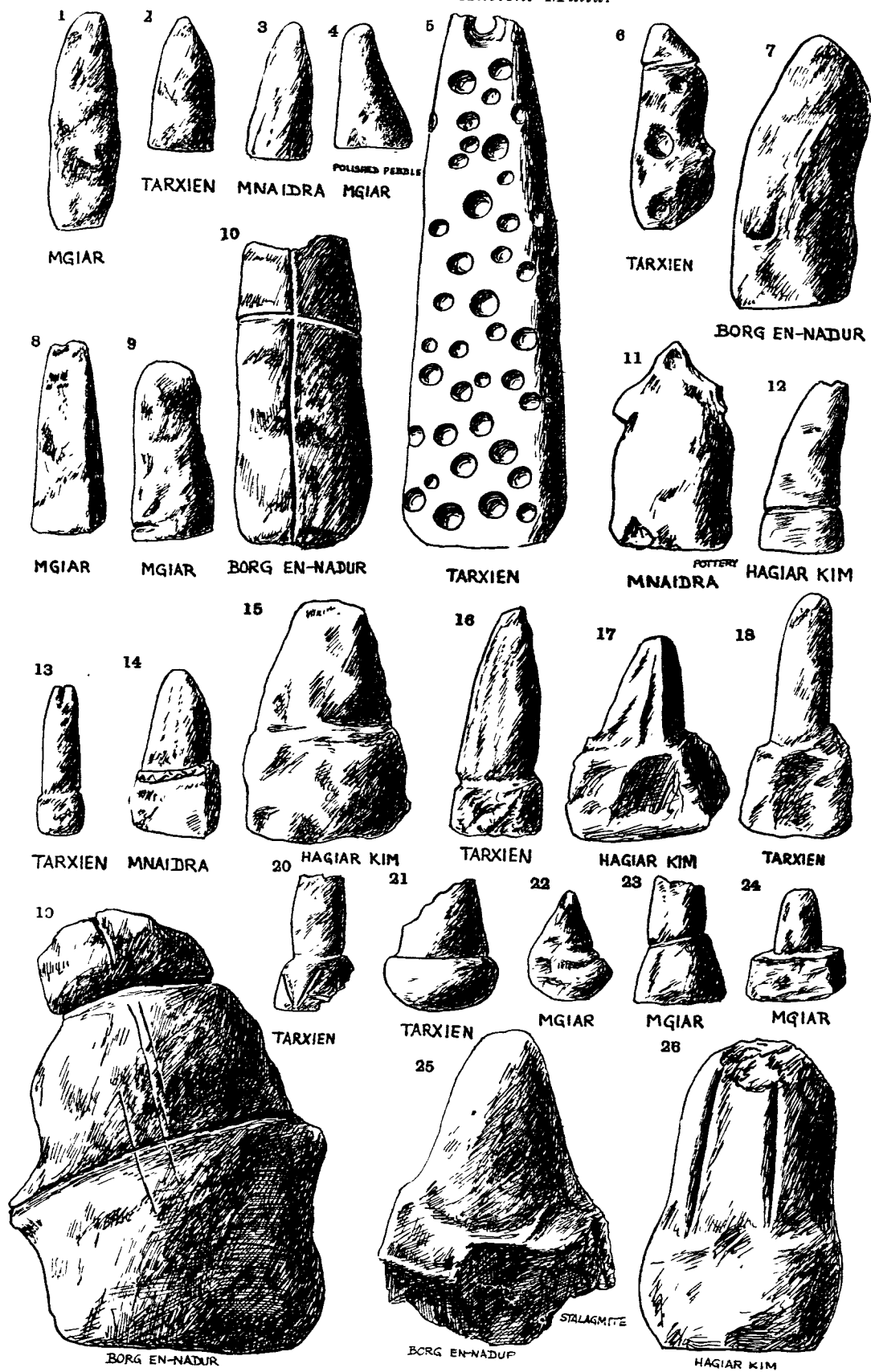


PLATE II.

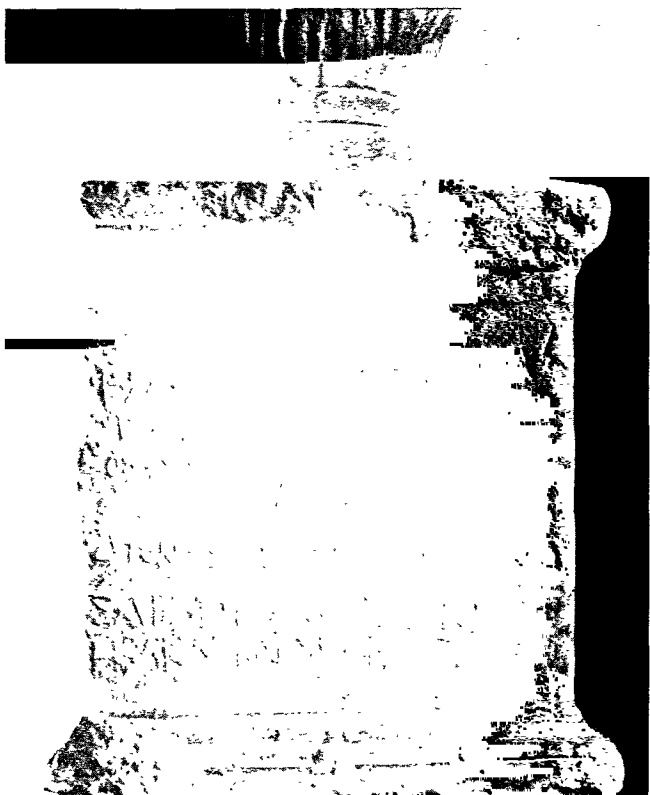
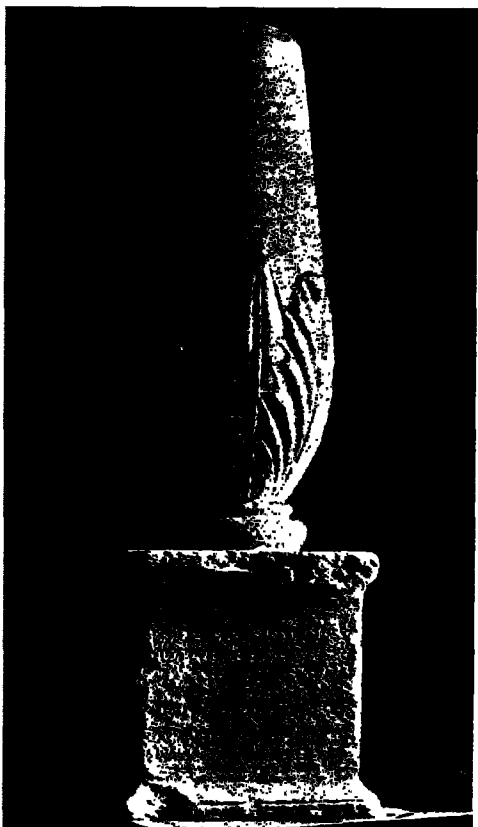


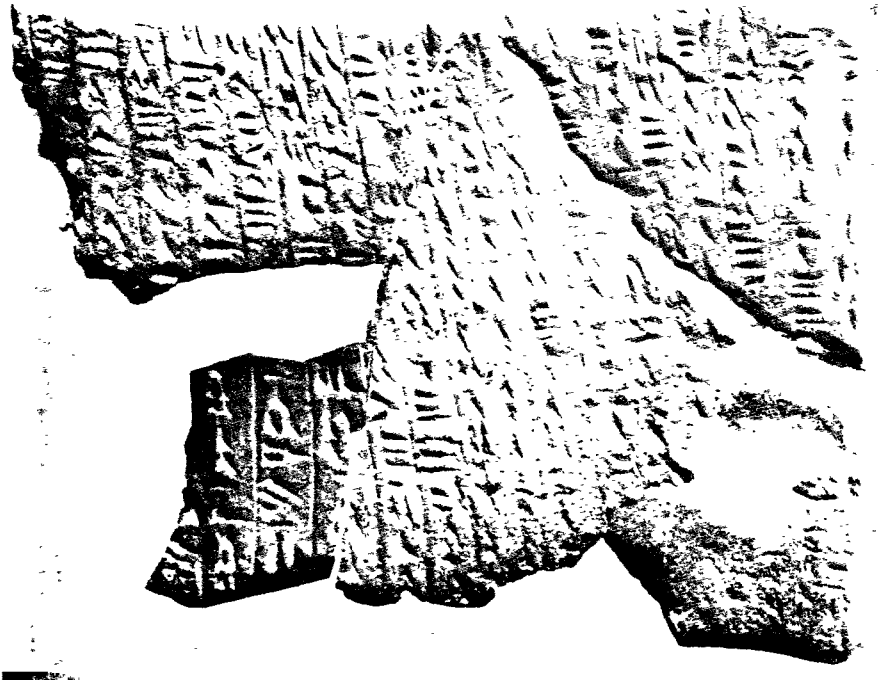
PLATE III.

was much frequented during the Bronze-age by sailors, their votive offerings of pottery anchors testifying to their gratitude to the god for a safe voyage. These sailors were probably Phoenician, judging by the dedication of the temple, and there are other indications as well. Two phallic stones of traditional form (pl. III, 1, 2) were found, about a century ago, in this temple. One of these stones is now in the Louvre, the other (reproduced here) is in the Malta Museum. The stones, decorated in the taste of the period, are set like some of their Neolithic prototypes on square bases. These bases have become pedestals on which a dedicatory inscription has been carved in Phoenician and Greek. The translation of the Phoenician dedication runs: "A vow from Abd-Osir and his brother Osirxamar, sons of Abd-Osir, to my lord Melkart, lord of Tyre, that he may hear their words and bless them." The Greek inscription is shorter and is interesting as showing the Hellenised forms of the Egyptian names borne by the Tyrian family: "Dionysios and Sarapion, sons of Sarapion of Tyre, to Herakles Archegetes." The date, judging by the style of the Greek lettering, must be the second century B.C. These stones then represent the "pillars" which were sacred to the Tyrian Herakles, and are perhaps copies of the famous gold and emerald pillars which Herodotus saw at Tyre. They are therefore another of the many links in the chain which connects the ancient civilization of Malta with that of Syria.

M. A. MURRAY.



REVERSE.



OBVERSE.

RAS SHAMRA 1929: No. 6.

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## RAS SHAMRA AND EGYPT

THE civilisation of Ugarit, recently unearthed at Ras Shamra on the north coast of Syria, has several points of connection with Egypt.

On the one hand, we now know that the Semites who inhabited it came originally from a land contiguous to Egypt and imbued with Egyptian influence, namely, the land of Muzri which comprises N. Arabia and the Sinai Peninsula.<sup>1</sup> On the other hand, we know that in later times the city frequently fell a victim to the warlike expeditions of the Pharaohs and was for long periods under Egyptian domination.

The civilisation of Ugarit contains, therefore, two elements of markedly Egyptian coloration, viz.: (a) the earlier Muzrian; (b) the later Amorite.

The former element has to be disentangled from the latter, the method of procedure being to isolate those factors which appear, both in point of language and of custom, to be of southern importation rather than of native Amorite (*i.e.*, N. Syrian) origin. When these have been isolated we obtain an interesting picture of early Muzrian culture.

This culture is an extremely important, if as yet insufficiently recognized, factor in the ancient history of the Near East. From the earliest times the turquoise mines of Sinai attracted the Semites, and the temple at Serabit al Khadem provides ample evidence of their settlement in this area. In Muzri also the religion of Israel finds its cradle-land. Before his acknowledgment as the national god of the entire Israelitic federation, Yaw was a god of the Muzrians. It was in Sinai that he revealed himself, and it was to the wilderness of Sinai that Moses wished to lead the people out of Egypt to worship him.<sup>2</sup> It was in Muzri that there lived the Midianite priest Jethro, who became Moses' father-in-law, and in the details of whose religion the Israelite lawgiver must have been well-versed. In the ancient song in Deuteronomy xxxiii, the Muzrian origin of Yaw is stated categorically: "Yhwh came from Sinai and dawned from Seir upon them. He beamed from Mount Paran and came from Meribath-Kadesh (LXX text)."

The influence of Muzrian culture upon Israel is therefore obvious. This lends especial significance to the marked parallelism between sacrificial institutions of the Semites at Ras Shamra and those of the early Israelites, for if the former can be traced to a Muzrian origin and the latter likewise, the similarity stands in an altogether new light, and we seem at last to find sound archaeological evidence "behind the Pentateuch." The parallels in question cover points of ritual and temple-procedure and have been elsewhere enumerated.<sup>3</sup> Many of the technical terms used in the Pentateuchal codes (however late be their literary redaction) find herein their ancient prototypes, and we seem even to recover the earlier forms out of which such things as the "Ark of Testimony" or "The Holy of Holies" subsequently evolved.

Nor this alone: the Egyptian connections of Muzri would doubtless have led to a certain amount of Egyptian coloration in that Muzrian myth and folklore which later percolated into Israel. Hence if Egyptian influence or coloration can be detected in certain old Israelitish stories recorded in the Book of Genesis, this may be due solely to an Egyptian element in the original Muzrian "Urform", and need not have resulted from the later sojourn of Israel (or parts of Israel in the land of the Nile.

But it is not only upon Israel that Muzrian influence made itself felt ; it is reasonable to suppose that it also penetrated into Egypt and that much of Egypt's Semitisation is properly to be referred to this source. The extent of this influence cannot yet be gauged, for we know too little about Muzri. One gift, however, which this region made to Egypt is significant ; this was the Alphabet.

It has long been pointed out, notably by Sethe and Gardiner, that the alphabet of the Semitic scribblings at Sinai (c. 1900 B.C.) was, to a large extent, the prototype of Egyptian alphabetical hieroglyphs. Now, it is precisely this alphabet which appears, in a form adapted to wedge-writing, in the Semitic inscriptions of Ugarit. The twists and loops have here been reduced to strokes and wedges, but the identity of the letters is, as Olmstead has shown (fig. 1),<sup>4</sup> unmistakeable. I therefore propose to speak of the Ras Shamra (Ugaritian) script as "Muzrian cuneiform" and of the Sinaitic script as "Muzrian alphabetical hieroglyphs." That this form of alphabet was once in use in the South of Palestine is a conclusion to which the present writer had already come, and

**Fig. I. SOME ALPHABETIC COMPARISONS**

	South Arabian	Sinaitic	Ras- Shamra
א	𐤀	𐤁	𐤂
ב	𐤂	𐤃	𐤄
ג	𐤃	𐤄	𐤅
ד	𐤄	𐤅	𐤆
ה	𐤅	𐤆	𐤇
ו	𐤆	𐤇	𐤈
ז	𐤇	𐤈	𐤉
ח	𐤈	𐤉	𐤊
ט	𐤉	𐤊	𐤋
י	𐤊	𐤋	𐤌
כ	𐤋	𐤌	𐤍
ל	𐤌	𐤍	𐤎
מ	𐤍	𐤎	𐤏
נ	𐤎	𐤏	𐤐
ס	𐤏	𐤐	𐤑
ע	𐤐	𐤑	𐤒
פ	𐤑	𐤒	𐤓
צ	𐤒	𐤓	𐤔
ק	𐤓	𐤔	𐤕
ר	𐤔	𐤕	𐤖
ש	𐤕	𐤖	𐤗
ת	𐤖	𐤗	𐤘
י	𐤗	𐤘	𐤙
כ	𐤘	𐤙	𐤚
ל	𐤙	𐤚	𐤛
מ	𐤚	𐤛	𐤜
נ	𐤛	𐤜	𐤝
ס	𐤜	𐤝	𐤞
ע	𐤝	𐤞	𐤟
פ	𐤞	𐤟	𐤠
צ	𐤟	𐤠	𐤡
ק	𐤠	𐤡	𐤢
ר	𐤡	𐤢	𐤣
ש	𐤢	𐤣	𐤤
ת	𐤣	𐤤	𐤥
י	𐤤	𐤥	𐤦
כ	𐤥	𐤦	𐤧
ל	𐤦	𐤧	𐤨
מ	𐤧	𐤨	𐤩
נ	𐤨	𐤩	𐤪
ס	𐤩	𐤪	𐤫
ע	𐤪	𐤫	𐤬
פ	𐤫	𐤬	𐤭
צ	𐤬	𐤭	𐤮
ק	𐤭	𐤮	𐤯
ר	𐤮	𐤯	𐤰
ש	𐤯	𐤰	𐤱
ת	𐤰	𐤱	𐤲
י	𐤱	𐤲	𐤳
כ	𐤲	𐤳	𐤴
ל	𐤳	𐤴	𐤵
מ	𐤴	𐤵	𐤶
נ	𐤵	𐤶	𐤷
ס	𐤶	𐤷	𐤸
ע	𐤷	𐤸	𐤹
פ	𐤸	𐤹	𐤺
צ	𐤹	𐤺	𐤻
ק	𐤺	𐤻	𐤼
ר	𐤻	𐤼	𐤽
ש	𐤼	𐤽	𐤾
ת	𐤽	𐤾	𐤿
י	𐤾	𐤿	𐥀
כ	𐤿	𐥀	𐥁
ל	𐥀	𐥁	𐥂
מ	𐥁	𐥂	𐥃
נ	𐥂	𐥃	𐥄
ס	𐥃	𐥄	𐥅
ע	𐥄	𐥅	𐥆
פ	𐥅	𐥆	𐥇
צ	𐥆	𐥇	𐥈
ק	𐥇	𐥈	𐥉
ר	𐥈	𐥉	𐥊
ש	𐥉	𐥊	𐥋
ת	𐥊	𐥋	𐥌
י	𐥋	𐥌	𐥍
כ	𐥌	𐥍	𐥎
ל	𐥍	𐥎	𐥏
מ	𐥎	𐥏	𐥐
נ	𐥏	𐥐	𐥑
ס	𐥐	𐥑	𐥒
ע	𐥑	𐥒	𐥓
פ	𐥒	𐥓	𐥔
צ	𐥓	𐥔	𐥕
ק	𐥔	𐥕	𐥖
ר	𐥕	𐥖	𐥗
ש	𐥖	𐥗	𐥘
ת	𐥗	𐥘	𐥙
י	𐥘	𐥙	𐥚
כ	𐥙	𐥚	𐥛
ל	𐥚	𐥛	𐥜
מ	𐥛	𐥜	𐥝
נ	𐥜	𐥝	𐥞
ס	𐥝	𐥞	𐥟
ע	𐥞	𐥟	𐥠
פ	𐥟	𐥠	𐥡
צ	𐥠	𐥡	𐥢
ק	𐥡	𐥢	𐥣
ר	𐥢	𐥣	𐥤
ש	𐥣	𐥤	𐥥
ת	𐥤	𐥥	𐥦
י	𐥥	𐥦	𐥧
כ	𐥦	𐥧	𐥨
ל	𐥧	𐥨	𐥩
מ	𐥨	𐥩	𐥪
נ	𐥩	𐥪	𐥫
ס	𐥪	𐥫	𐥬
ע	𐥫	𐥬	𐥭
פ	𐥬	𐥭	𐥮
צ	𐥭	𐥮	𐥯
ק	𐥮	𐥯	𐥰
ר	𐥯	𐥰	𐥱
ש	𐥰	𐥱	𐥲
ת	𐥱	𐥲	𐥳
י	𐥲	𐥳	𐥴
כ	𐥳	𐥴	𐥵
ל	𐥴	𐥵	𐥶
מ	𐥵	𐥶	𐥷
נ	𐥶	𐥷	𐥸
ס	𐥷	𐥸	𐥹
ע	𐥸	𐥹	𐥺
פ	𐥹	𐥺	𐥻
צ	𐥺	𐥻	𐥼
ק	𐥻	𐥼	𐥽
ר	𐥼	𐥽	𐥾
ש	𐥽	𐥾	𐥿
ת	𐥾	𐥿	𐦀
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to which Dussaud also came subsequently.<sup>5</sup> It is now vindicated by the discovery at Beth-Shemesh, near Jerusalem, of a tablet inscribed with the same script.<sup>6</sup> This alphabet is the lineal ancestor both of the South Arabian and of the Phoenician systems, but into these later ramifications we cannot here enter.

We pass now to the later period of Ugaritic civilization, *i.e.*, the Amorite.

The seaport of Ugarit fell a victim, like many another Amorite city, to the frequent Egyptian invasions during the second millenium B.C. The Poem of Pentaur numbers it among the cities subdued by Rameses II, whilst an Amarna letter<sup>7</sup> contains an appeal to Pharaoh to protect it from the marauding Hittites, as if he were its lawful guardian. One of the texts<sup>8</sup> refers to its *rabits* or "governor"—the very word used in the Amarna letters for the Egyptian viceroys, and which I would equate with Egyptian *rw'd'w* of the same meaning. Moreover, excavation reveals alike in architecture, handicrafts and scarabs Egyptian influence dating back to the Hyksos period. One scarab bears the official name 'Anra which has been found also at Gezer, Jericho, Jerusalem, and Megiddo, whilst another exhibits the "twisted rope" design characteristic of the period between the XIIth and XVIIIth dynasties and especially predominant in Hyksos work.

The influence of Egypt upon belief and practice is very pronounced, though little recognized. The following points should be noted.

(i) One of the smaller texts unearthed in 1929 (No. 6) and hitherto obscure seems on examination to be a congratulatory ode to the Egyptian overlord in the form of Horus. He is described, in a poetic crescendo, as "governor" (*hbs*: cf. *חבש* Is. iii. 7; Job xxxiv. 17), "ruler" (*mhr*: cp. Egypt. *mhr*; Assy. *mu'irru*), and finally "lord" (*sr*: cp. Egypt. *sr*; Assy. *sarru*). All the maritime states from Tyre to Paphos (in Cyprus) are bidden to pay him honour, just as in a text found at Deir-al-Bahri the islands of the sea pay honour to the monarch's *ka*. He makes his foes "fall flat like a brick" (*klbnt*), just as Horus was greeted at his appearance as he that "triumphs over all evil ones." He "rises like a star of good fortune" (*kbbbt n'm*: cf. Phoen. *מול יעם*), just as Egyptian kings were said to "rise." The goddess of watersprings shows him favour, *i.e.*, at his accession the land is irrigated, just as the Egyptian Pharaoh produces the annual inundation of the Nile. Noblemen (?) are led up in procession after him, just as at the festival at Edfu and at the royal induction (*bs n'i-sw't*).

I give below my translation of this text, reserving full philological commentary and transcription for a future publication. A transcription by Dhorme, which differs somewhat from mine, will be found in *Revue Biblique*, January, 1931, p. 43.

(1929: No. 6) *Ode to an Egyptian Overlord.*

(Loquitur Deus): Slay four peace offerings in Tyre! O Paphos, pour . . . libations for thy ruler. Slaughter wi(ld oxen) for thy governor, and fowl for thy lord, (saying) "We esteem thee our lord."

And thou, my lord governor (*rbs*), acclaim thy lord, for I it is marked out thy lord (saying unto him):

"Behold, I set thy throne in the (heart of) the seas, high authority is thine! Moreover, thou shalt make thy foemen to fall flat like a brick, and whensoever the soothsayers tell thee that there is violence in them, behold, they shall be made to flee straightway like birds to the farthest edge of the deserts or to the sanctuary of altars!"



Thou Horus, (how thou risest a very star of good omen (dispelling) the darkness!

Our Lady of the Wellsprings shows thee her favour; she bends the knee unto thee (saying), "Be thou enthroned!"

Nobles (?) do I lead up in procession (behind thee). Thy deeds shine fair. "Better are they," so men say, "even than those of his divine father." Yea, thy report is of good seeming in the mouths of all that wander by the way!

Moreover, among . . . I lead up noble men (?) in procession among thy vassals and . . .

Now when thou art garlanded with garlands, now when thou art robed in light, as a very angel out of heaven thou gettest for thyself thy portion; yea, as a king out of heaven farest thou forth!

Saith the Daystar: "A new star is risen up among you"!

Saith the Firmament: "like . . . Asherat . . . Earth, Baal, Ashtareth, Anath! See, he now is born. Let his glory be rehearsed; let the tale of his conception be noised abroad! Her own breast doth (the Goddess) give him to suck! . . ."

(ii) Another text with Egyptian connections (1929, No. 5) is that which opens with the words: "When Ashtareth inducts Horus." This text has been widely quoted, and the opening lines are usually translated: "When Astarte introduces Horus into the house of the king, *Štrmt* shall put on ten and ten (*esr 'esr*) . . . as garments. Then *Hšpšt* shall place Horus three camps (*mhn*) from thy house (*dr k*)." I believe, however, that the correct rendering is as follows: "On the occasion when Ashtareth inducts Horus into the palace, tithes shall be levied (*esr 'esr*) [and brought] into the temple. On that occasion she is to dress in regal raiment (*štrm tlbs*), and Horus is to furnish libations (*éšp't*) for the three reservoirs (*mzn*) in the temenos (*dr*)." The text describes the levies and offerings payable on the occasion when the "Sacred Marriage" is celebrated between Hathor and Horus. As on many Palestinian figurines, Hathor is here Semitized as Ashtareth. The parts of god and goddess were played by priest and priestess. As Blackman has shown, Egyptian priestesses were often called "Hathor" and priests "Horus."<sup>10</sup> I give below my rendering of this text.

(1929: No. 5) *Ritual for the Induction of "Horus."*

1-8: On the occasion when Ashtareth inducts Horus into the palace, tithes shall be tithed<sup>1</sup> and brought into the temple.

On that occasion she shall attire herself in regal garments, whilst Horus shall furnish libations for the three reservoirs in the temenos.

At the same time, a lamb, an ox and three sheep shall be offered as *šlm*-offerings to the Seven Ladies of Might, and a bullock shall be presented<sup>1</sup> to the gods (*Elim*).

9-16: Over and above these, tithes shall be brought\* into the palace as follows: a shekel of gold for Sun and Moon as a tithe; also, a shekel of silver of good type both externally and internally.

As a supplement thereto (?) shall be presented another shekel of gold for Sun and Moon as a tithe, and as well two shekels of silver of good type both externally and internally.

. . . an ox and a sheep.

\* In the original, 2nd sg. imperative, addressed to the officiant; this text being his "book of words."

17-23: . . . . as their tithes; . . . as their sin-offerings; . . . (ca)lves, rams; . . . as their sin-offerings; . . . as their oblations (?); . . . ; (in fine raiment) shall Horus attire himself.

Then shall the king proceed to the courtyard (?) of the gods (*Elim*).

24-26: To the Sacred Spot of the gods (*Elim*) shall the king proceed on foot; yea, the king shall proceed on foot.

Then the Seven Ladies of Might unto all of them. . . .

Apart from these texts there are also several traces of Egyptian influence in the other tablets. The following is a selected list of points which might be noted:—

(i) In the description <sup>11</sup> of how a certain temple was built, reference is made to the construction of a *bt ar* which would normally mean “house of sunlight, daybreak.” This may be explained most satisfactorily as a rendering of Egyptian *pr dwʾt* “house of daybreak”—a kind of chapel for lustrations, often attached to temples.<sup>12</sup>

(ii) The hierodules are each called *ašt El*, or “wife of God.” This looks like a rendering of the Egyptian title *ḥmt ntr*.

(iii) Two texts written in verse contain rubrics referring to the manner of recitation. In two places<sup>13</sup> occur the words *šb lm špr*, “turn back to the passage . . .” and *yšb y špr*, “they are to turn back and recite again.” This formula is cast upon an Egyptian model, just as when we write N.B. or P.S. we are following a Latin style. In analogous Egyptian texts we sometimes find the rubric *ts phr*, of which the phrases cited are almost literal translations.

(iv) Egyptian texts speak of a Syrian deity *Knt* whom it has hitherto proved impossible to identify. The Ras Shamra texts clear up the difficulty when we find the queen-goddess Asherath referred to it by the epithet *knyt*<sup>14</sup> meaning “glorious” (Arabic كَتِي), which compares also with the title *kanūtu* sometimes given in Assyrian to Ištar.


(v) In the temple little chapels were erected for various gods, and these were called *mšllm* or “shaded bowers.”<sup>15</sup> This suggests an imitation of the Egyptian *sh ntr*.

(vi) A speculative suggestion is that the reason why, despite the marked Egyptian influence upon Ugarit, the only Egyptian god mentioned by name is *Hr* (Horus) is that this deity had once belonged to the native pantheon in Muzri whence the Semites of Ugarit came. His retention, though with Egyptian colouring, would then be easier than the importation into the pantheon of a definitely Egyptian god. This suggestion is based upon the view of Petrie and others that Horus was originally an “Arabian” deity. In this connection, I would call especial attention to חר as the name of a Midianite king,<sup>17</sup> and to חור as a proper name on Nabatean inscriptions.<sup>18</sup> Cp. also אֲשֶׁחור (gift of Hur?) as the brother of the southern Jerahmeel,<sup>19</sup> and חר in several southern (Judahite) names.<sup>20</sup>

(vii) Lastly, I would venture the suggestion that the sacrificial term *šlm* usually associated with Hebrew *šelem*, “peace-offering” (or “payment-offering”?), is at Ras Shamra an imitation of the Eg. *ḥtp*. Just as *šlm* suggests *šalom*, “peace, prosperity,” so *ḥtp* suggests *ḥtp* of the same meaning.

As Ras Shamra studies are still in their infancy and all the material has not yet been excavated or published, the conclusions here given are therefore subject to future modification.

## NOTES.

1. v. *The Beth-Shemesh Tablet and the Origins of Ras Shamra Culture*, Quart. Statement, P.E.F., April, 1934.
2. Exodus v. 1; vii. 16.
3. v. *The Ras Shamra Texts and the Old Testament*. Quart. Statement, P.E.F., June, 1934; Journal of Transactions of the Society for Promoting the Study of Religions, June, 1934.
4. Martin Sprengling, *The Alphabet*: appendix.
5. *Les Phéniciens du Negeb*; Revue de l'Histoire des Relig. cviii. (1933), pp. 5-49.
6. v. supra n.l.
7. Brit. Mus. 30; Ber. 128.
8. RS. 1929, vi. 9: I suggest "My lord mayor."
9. 
10. JEA vii. (1919), 11ff; ERE xii, 777b.
11. II AB i. 47.
12. v. Blackman, JEA v. (1917), 148ff; 156.
13. II AB iv-v. 104; *Shahar-Shalem*, 56-7. Editions of both by the present writer are forthcoming.
14. II AB i. 16.
15. II AB i. 14, 18.
16. I AB ii. 8-9; cf. II AB iv-v. 18.
17. Numbers xxxi. 8; Joshua xiii. 21.
18. Cooke, *North Semitic Inscriptions*, p. 200.
19. I Chronicles ii. 24; iv. 5.
20. e.g., Exodus xxxviii. 22.
21. *Shahar-Shalem*, xiii. 28.

## THE CULT-HUT OR MANDI OF THE MANDAEANS.

THE use of a cult-hut called a *mandi* (fig. 1) is mentioned by Bar Khuni (or Konai) writing in the VIIIth century A.D., as being peculiar to the Mandaean religion. His theories as to the origin of the religion are as fanciful and charitable as polemics usually are, but the mention of the cult-hut as part of the cult is significant. In the sacred books themselves, the cult-hut is given the name *mashkhana*, and not *mandi*, and when I have asked the priests why, they say that *mandi* means *mashkhana* or dwelling. One priest added, "The word is Persian."

Many of the names of Mandaean cult-objects and of divine beings are of Persian or Indo-Iranian origin, and it is, therefore, not unlikely that this word "*mandi*" may, as the priest suggested, be of Persian origin and have nothing whatever to do with the Semitic root '*ada*, to know. Throughout the holy books



FIG. 1.

of the Mandaeans (*Mandai*) the word for "knowledge" is *madita*. The favourite personage in the Mandaean pantheon, however, is called Manda d Hiia, and this has been translated, without dissent, as far as I know, as "knowledge of life," and the word "*Mandai*" as "gnostics." It is a most natural conclusion, but it is only a philologist who can say if it is possible that the word may come from a totally different source. Manda d Hiia is a personification certainly, but I own that I have doubts that he is a personification of "Knowledge of Life." When separated from the name Manda d Hiia, the meaning "knowledge" becomes a little strained, as, for instance, in the sentence (Qulasta),

"Thou (Manda d Hiia) art . . . the great Tree which is all *mandia*."  
(plural)

The tree is a common religious symbol of divine Life, and the souls of Mandaeans are not infrequently represented as birds taking refuge in the shelter

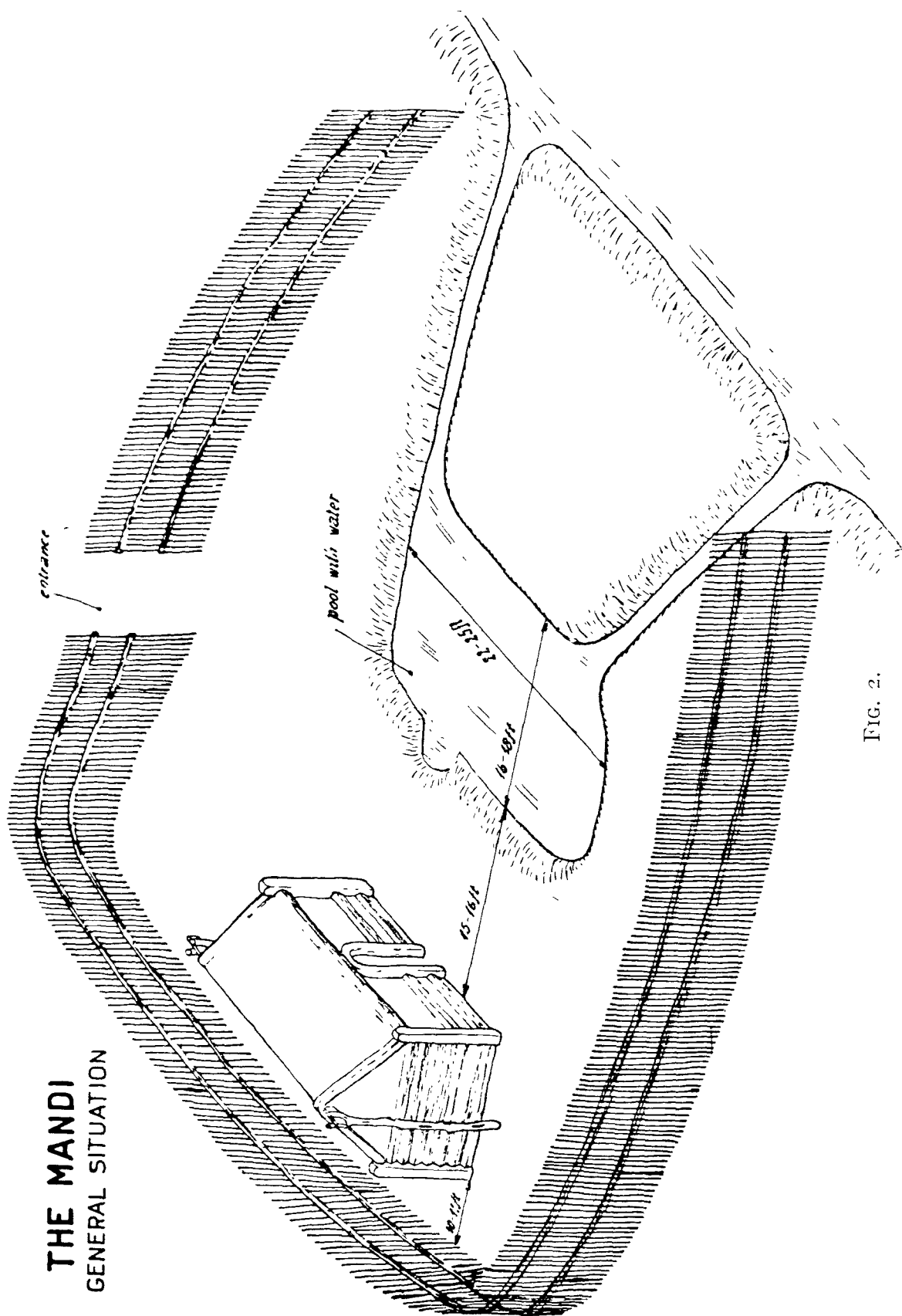


FIG. 2.

of a Vine or a Tree against the tempests of the world. To translate the word "dwellings" or "shelters" would, therefore, make sense.

The present-day Mandai (or Şubba), who inhabit the marshes and banks of the lower reaches of the Tigris and Euphrates in 'Irāq and the towns and villages in Khuzistān have a clear tradition which throws still more light on the possible origin of the word "mandi." It is generally known, and I have heard it from both priests and laymen. This tradition or legend is that the Mandai once inhabited a mountainous country where there were hot springs, called the *Ṭura d Maddai*, or "*Ṭura d Mandai*" (the former is the commoner form). This "mountain" figures in the illustrations to one of the Diwāns which I have seen. In a forthcoming book I intend to go into these legends; suffice it to say here that the more learned amongst the priests point to this mountainous country as being to the north-west (that is, the country below and about the Caspian Sea). There was a district known as Manda in late Babylonian times; Winckler, in *Untersuchungen zur Altorientalischen Geschichte* 1889, places this "Manda" "am kaspischen Meere und östlich davon." There are conflicting ideas as to the whereabouts of this province. About 553 B.C. (I quote from the Cambridge Ancient History), the god Marduk, appearing to Nabonidus in a dream, bade him restore the ancient and famous moon-temple of Harran. The king urged that it was still in the hands of the Umman-Manda, and asked how could a Babylonian king "interfere with their share of the spoil obtained by Cyaxeres? The god answered that the Umman-Manda were dead or scattered, for in the third year of Nabonidus Cyrus, the king of Anzan, had defeated them, carried Ishtumegu (Astyages) into captivity and had spoiled their city of Ectbatana."

Winckler surmises that the Umman-Manda were possibly a Median tribe. Rogers, in his history of Persia, ventures the equation that the Manda were Madai, or Medes. Delattre (*Le peuple et l'Empire des Mèdes*, 1883), say:—

"Dans l'inscription babylonienne qui porte son nom, Cyrus, déjà maître de toute l'Asie occidentale, divise les peuples qui lui obéissent en trois groupes, les peuple de Qûti ou Guti, les peuples de Tsalmat-qaqqadi, et les peuples de Manda. Les Qûti étaient les peuples de l'Arménie, les peuples de Tsalmat-qaqqadi étaient la masse des nations soumises aux empires essentiellement sémitiques de Ninive et de Babylone. Les peuples de Manda étaient les sujets des rois Mèdes. Nabonide donne à Astyage le titre de "roi des hommes de Manda." La dénomination de "hommes de Manda" est appliqué par Asarhaddon aux Gimirriens (Cimmériens, peuple de Gomer, voisin de la Mer Noire), auxquels la Bible attribue les affinités avec les Mèdes, et qui aidèrent ceux-ci à ruiner l'empire de Ninive. De cet ensemble, est-il permis de conclure que le nom de "peuple de Manda" était une qualification ethnique désignant les peuples aryens voisins du Caucase, comme les Cimmériens, ainsi que les peuples de l'Iran?"

What is the actual meaning of this word *manda* or *Mada* if this trail be followed? It occurs in many dialects derived from old Persian; for instance, in Northern India the word *mandi* means a bazaar, or covered-in market. In Gujerati there are the words *mandap* or *mandva*, meaning a "shelter" or "pavilion," and the Todas of the Nilgiris in Southern India, who also have a tradition of migration from the Caspian, call their village, or group of huts with a dairy for the sacred buffaloes,\* a *mand*. *Ma-Da* occurs in Sumerian as meaning

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\* Buffaloes and kine are sacred to the Mandaeans also, and their byres are within the courtyard-enclosures of the houses.

land, or settlement, but is probably a loaned word. A correspondent equates *mada* with the Kurdish *malh* (home, house). *Mada* leads us back to the Madia or Medes. May we conclude from all this and other evidence that the word originally had a meaning of "a settlement," "dwelling-place" or "shelter," and indicated a building or collection of buildings in contrast to the temporary erections of wandering tribes?

To return to the Mandaean "*mandi*" or cult-hut: certain laws as to its construction and proportions, its materials, and its shape, are prescribed by written law and tradition. Those that I have seen vary slightly in size, but not in proportion or general plan. During the four days preceding *Panja* or the five days' lustration (or baptism) feast, the *mandi* is looked upon as defiled, because these four days are dedicated to the powers of darkness. I have been

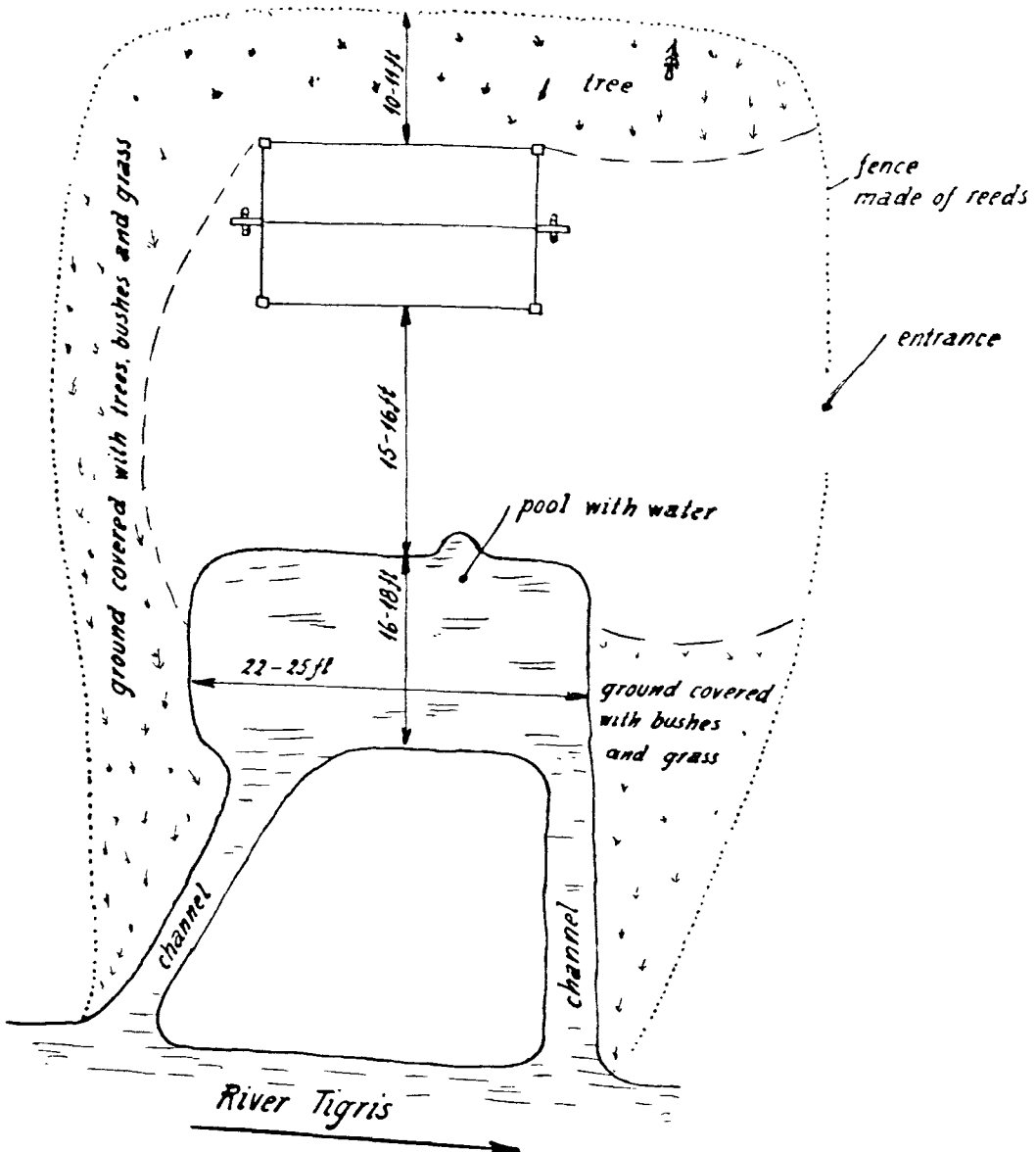


FIG. 3.

able, during these, therefore, to make exact observations as to its structure and measurements, and to take photographs. The *mandi* is always built on a river bank (figs. 2, 3), has a fencing of reeds, or a mud wall, round it (not essential, its purpose is to screen the rites from the eyes of the profane), and is invariably linked with a lustration pool\* fed from the river by a water-channel, another channel (fig. 4) conveying the water away from the *mandi* and back to the river, or into the fields, the object being that the water shall be perpetually flowing, and the pool hold "living" and not "cut-off" water.

Both hut and pool are enclosed by the reed fence or mud wall (*tōf*) which passes over the two water-channels, and during the immersion ceremonies, with the subsequent sacraments of bread and water, a white silk banner, about three *dhras* long, is erected on the bank to the right of the hut, a position which never varies.



FIG. 4.

Before describing the cult-hut more fully, I must begin by saying that it is a simple construction of reeds and reed-mats (*buwāri*) daubed with mud. Reed-

\* The use of a ritual pool or *apsu* in connection with Ea, god of the waters, seems to have formed part of the Sumerian cults at Eridu, the ancient city site only a short march from a modern *mandi* at Sūq-esh-Shūyukh. Father Burrows, in a recent publication (*Orientalia. Problems of the Abzu: Commentari Periodici Pontifici Instituti Biblici*: Rome, 1932) discussed the *apzu* or *abzu*, which, he concludes, cannot have been a libation drain as has been suggested, but a basin or pool, pointing out that some of the names of cult-*abzus* at Lagash indicate pools "connected with canals, or the like."



huts (or *ṣarāif*) are the usual dwellings of inhabitants of the marshes and of the Ma'adān Arabs of the south, whereas the black hair tent betokens the desert Arab, or the gypsy (*Kauliyah*), that is to say, the nomad and herdsman rather than the settled or semi-settled tribesman. The villages of the marsh-Arab are built entirely of reeds, whereas the shepherd-tribes of the waterless plains use exclusively the black, woollen tent. If a nomad tribe settles, it at once uses the reed-mat instead of the woven wool tent-cloth, as in the case of the Beni Tamīm, who have become settled during the past fifteen years. Almost any southern town of 'Irāq, from Baghdad downwards, has a suburb of reed-huts inhabited by *fellahin* (agricultural labourers) and a floating population who bring in dairy produce, fowls, or sheep to the town markets.



FIG. 5.

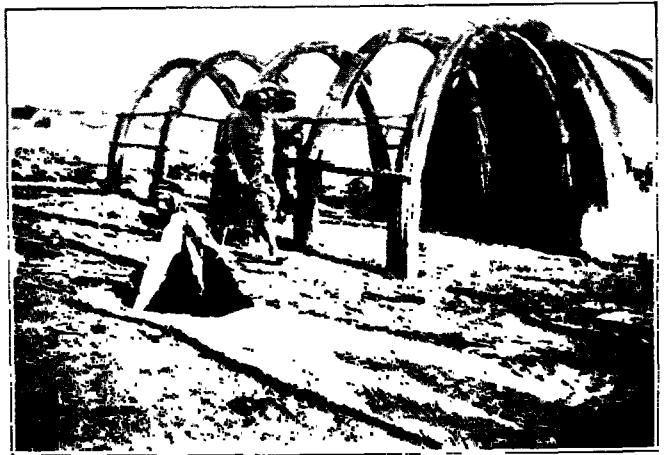


FIG. 6.

There are several types of reed huts, the most common being the *kūkh*, (figs. 5, 6), the supporting framework of which is bundles of reeds tied and bound together at the top so as to form half-hoops. This is used almost exclusively in the marshes. The next type is called the *jemāli*, which is more permanent and weather-proof in character, and differs in construction. A ridge-pole is supported, either by two forked poles or by two bundles of reeds split at the top into a fork. The ridge-pole gives the reed-matting thrown over it its main support, and the roof slopes down, therefore, steeply to the low side walls, the end walls being higher, as in an English thatched cottage. The walls consist of standing bundles of reeds (*qasab*) bound tightly together by rushes (*bardi*), or ropes made of rushes, with crosswise bundles fastened transversely to the uprights. The reed-matting which covers both roof and walls is often daubed with mud, and the walls in more permanent communities undergo a logical development and are built of *liban* (mud) instead of reeds. The semi-nomad inhabitant then becomes a house-dweller.

The *jemāli* grows increasingly common the nearer one approaches to Basrah, or to the Persian border, and in Southern Persia it is almost universal. I am

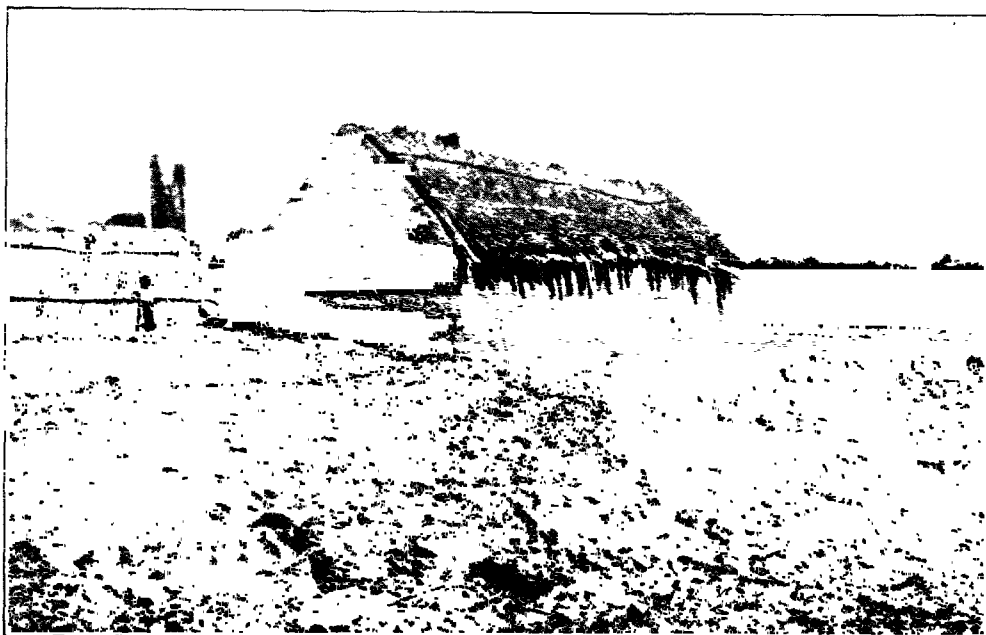


FIG. 7.

told that the "thatched cottage" type of hut (fig. 7) with reed roof, or reed roof reinforced by rough thatching of reeds above four mud walls, is extremely common near the Caspian Sea, where travellers are reminded of the thatched cob cottages of Devon. The pent roof may have been devised that snow may slide off on to the ground.

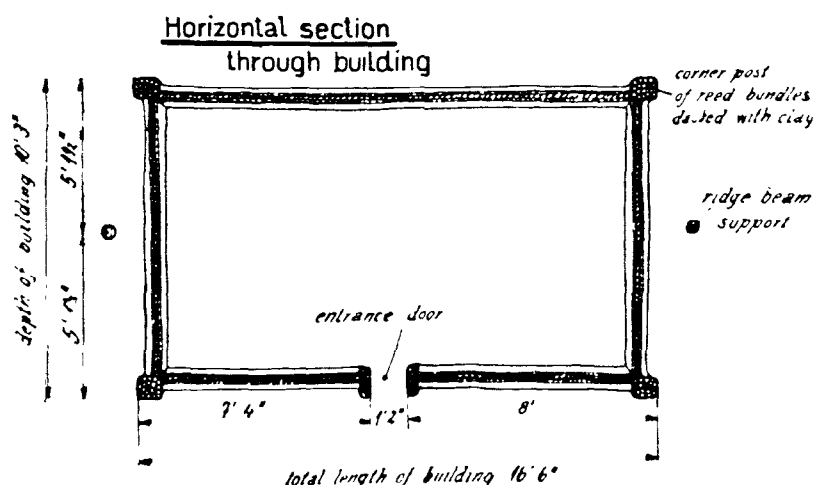


FIG. 8.

The *mandi* is of the *jemāli* type, which suggests a Persian origin. It is oblong in shape (fig. 8), the north and south walls being the long walls, and is built so that a person entering the small opening in the middle of the south wall (fig. 9) will face the North Star, which is the correct *Qiblah* or direction which a man must face when praying. The door-opening is narrow, only about 14 inches wide, and is about 60 to 65 inches high. The top of the entrance is narrower, and the mud with which the reed substructure is faced is moulded into a rough triple arch. One *mandi* that I saw also had a triple moulding about the entire south

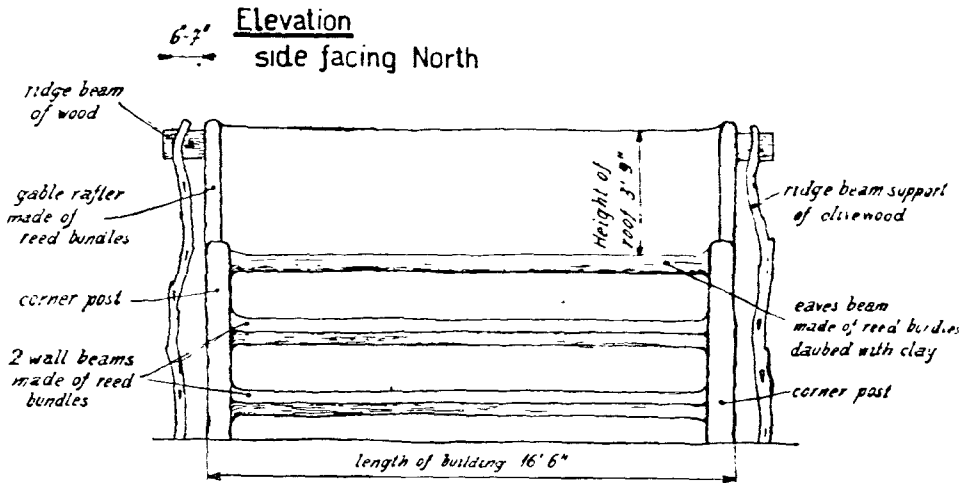


FIG. 9.

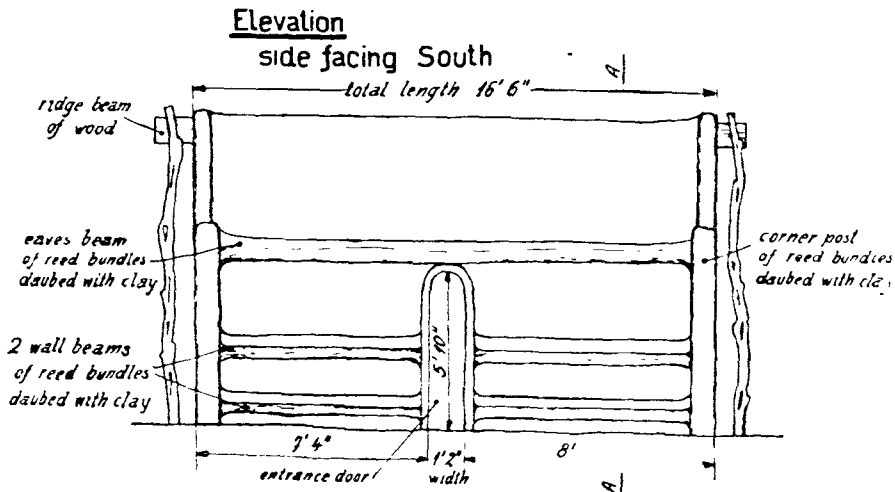


FIG. 10.

face of the *mandi*, called *misra*. The ridge-pole projecting from the *mandi* is supported by two strong bundles of reeds daubed with mud, and in the case of two *mandia* that I have examined the ridge-pole had further support in the shape of two poles, forked at the top to receive the ridge-pole (fig. 10). These supporting poles, of olive wood, were some inches away from the actual reed-supports, and were entirely clear of the building itself, for the ridge-pole, which runs east and west, projects at each end. The dimensions may differ, but, I am informed by Mandaeans themselves, the number of reed bundles may not vary. The verticals from the ground to the ridge pole (*ardhāna*)\* on the east and west sides of the *mandi* (including the vertical in which the *ardhāna* is placed) are called *shebbab* (singular, *shebba*). The cross-pieces (*hattār*) on each wall are seven in number, so that there are forty-two in all. The two upright bundles of reeds, or *shebbab*, which support the ridge-pole are called *tikm* (sing., *tikmah*). The half of the *tikmah* which projects from the wall measures about 57 centimetres.

\* The common Arab word for the ridge pole is *jisr* or bridge.

The photograph of the *mandi* (fig. 1) illustrates the manner in which the cross-pieces are used.

The interior of the hut shows the construction of the *mandi* even better than the exterior, but I was not able to take a photograph owing to the absence of light. From within one sees that beneath the reed-matting (*bāriya*, plural *buwari*) there is a layer of stout reeds (fig. 11) knotted together with string so as

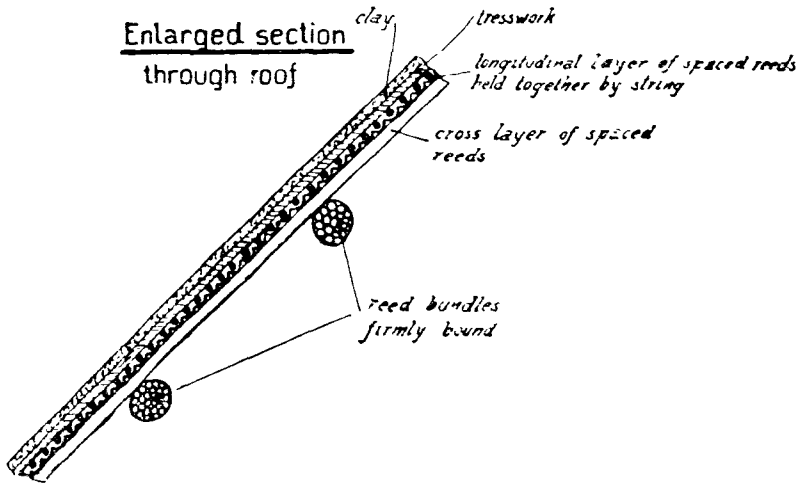


FIG. 11.

to keep them in place, a fabric which recalls the reed screens made by the tribeswomen of the desert to screen off their part of the tent from the men's part. Across this, at right angles on both slanting sides of the roof, are placed seven bundles of reeds, and across these again three long bundles (fig. 12) run from east to west. There is no window and no inner decoration. The only detail in the interior to be noticed is the presence of two pegs, called *shugāsa*, which project, like a V placed sideways, from each *tikmah* at the east and south ends of the structure. The point of the V is not closed, and I was told that the object of the pegs is to provide support for a dish or for clothes.

No iron or nail is employed in the building at all, but that has little ritual significance, as the same might be said of any reed hut in the marshes. The only lighting is from the door, and there is no kind of decoration or floor covering.

The *mandi* is not used for any cult in which laymen take part, and even

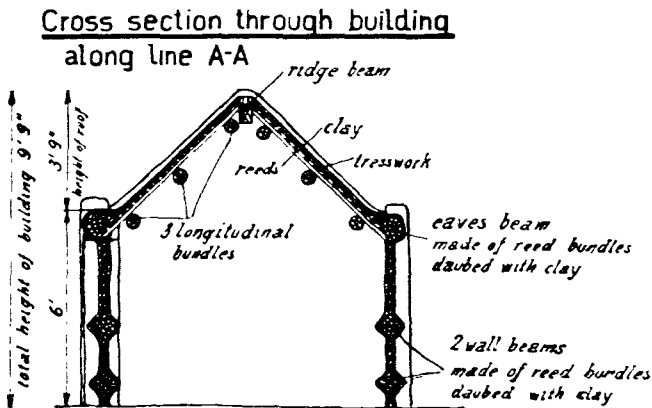


FIG. 12.

the *zidqa briḱḱha*, or solemn eating for the dead, in which priests only take part, takes place without its walls. But the ceremony known as the "*taraṣa d mandi*," or consecration of the *mandi*, which takes place once a year at the end of the five days' baptism feast (*Paranoia* or *panja*) is partly performed within the *mandi*, as are some of the ceremonies connected with the consecration of a priest. In the book shortly to be published I have dealt with these cults, and particularly with the re-consecration of the *mandi*. It is a ceremony oddly close to the re-consecration ceremonies for a desecrated temple translated in M. F. Thureau-Dangin's *Rituel Accadiens*.

The pool is usually reached by a rough step, so that the candidate for ablution may step up and down without difficulty. Upon this step, or upon the bank, he places his offering to the priest on emerging from the water. He then faces the north (and the *mandi*) for the ensuing administration of the sacraments of bread and water. No part of the "baptismal" or "sacramental" rites takes place within the edifice.

The plan given is not that of the *mandi* of the photographs, which is at Litlaṭa, but that of Qal'at Ṣālih, which is bigger and has the supporting poles as well as the reed *tikm*.

E. S. STEVENS (Mrs. E. M. DROWER).

NOTE.—In Mrs. Drower's article there are many points of interest. One of the most suggestive is the style of building of the *mandi*, which shows that the cult-hut of modern 'Irāq is a survival of a primitive type. The hieroglyphs show that the forked support was a common form in ancient Egypt, being used to hold up vines (fig. 2), and also as a central post for light structures built of reeds (figs. 1 and 3). That such structures had a religious significance is indicated by the fact that the cult-hut (fig. 1) is placed above the sign which means a festival; the inference necessarily being that the hut was an integral part of the religious ceremonial.

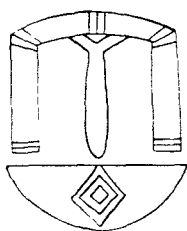


FIG. 1.

TOMB OF PTAH-HETEP,  
DYN. V.

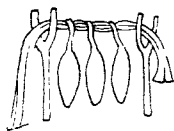


FIG. 2.

TOMB OF TEHUTI-HETEP,  
DYN. XII.

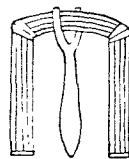


FIG. 3.

TOMB OF PTAH-HETEP,  
DYN. V.

Again, Mrs. Drower mentions the mud-covered reed-pillars which recall the primitive pillars which must have characterized the earliest attempts at building in ancient Egypt. Such pillars are known to us by the imitations in stone, which are found in almost every temple in Egypt from the IIIrd dynasty to Ptolemaic times.

M. A. MURRAY.

## THE SYRIAN PROBLEM IN THE EL-AMARNA PERIOD.

THE foreign politics of the El-Amarna period present great difficulties. Many attempts have been made to solve the mystery of the attitude of Akhenaten towards the Syrian province, and it is usually assumed that he was in possession of full information concerning the province, but refused to act. The suggestion is now made, however, that examination of the evidence shows that this assumption may not be justified.

The details which the text of the letters furnishes lead to the conclusion that Akhenaten was not aware of the real situation, and that no help was sent to the struggling chieftains in Syria because he was kept in ignorance of their plight by the treachery of the court officials.

It is therefore suggested that the text of the letters should be examined from an entirely new angle, viz., the religious standpoint ; for nobody would doubt that religion was a matter of overwhelming importance in that era.

The manner in which the religious revolution of El-Amarna times reacted upon the official correspondence can be noticed, and this, together with other data, provides information which, it would seem, suggests a solution of the mystery of the Syrian problem.

The facts of the situation are briefly these : There was a certain amount of disloyalty and intrigue among the states on the northern borders of the Egyptian Empire, and, in addition to this, Syria was over-run with hordes of warriors, *Sa-Gas*, as they are usually called. The prince of Jerusalem gives them the name of *Khabiru*. They apparently came from the North-East, and were evidently people without a nation and without a home. Soldiers of fortune, they were ready to serve any master who paid them adequately. There is an example in Kn 195<sup>1</sup> of the *Sa-Gas* being in the service of one of the princes as loyal to Egypt. Namiawaza writes (Kn 195, 24 ff.) :—

“ Behold, I, together with my warriors, and my chariots and my brothers, and my *Sa-Gas* people, and my Suti (will go) with the troops to that place whither the king my Lord commands.”

Usually, however, and eventually entirely, the *Sa-Gas* were employed by the disloyal princes of Syria to shake off the Egyptian yoke and to win for themselves a precarious independence.

The text of the El-Amarna letters illustrates the fact that the thoroughness of the religious revolution even reached “ the place of the records of the king’s

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<sup>1</sup> Kn=J. A. Knudtzon, *El-Amarna tafeln*, 1915. The numbers given throughout refer to this book.

house," for the tablets containing official documents which had been brought to El-Amarna were taken out from the place of storage and scrutinized. The name of the god "Amon" which was erased throughout Egypt at this time was also erased from these diplomatic and official letters. That the erasure of the name "Amon" in the letters was no accident but carried out according to a definite plan is quite clear from the detail, which the text of the various letters exhibits.

That tablets of former reigns were stored and consulted as required is evident from the fact that Rib-Addi writes in *Letter 74*, lines 10 ff., to the king:—

"Let the king look at the tablets of the house of his father, whether or not the Man who is in Gebal is a true servant."

It will be found on examination of the text of the letters that on some occasions the name of "Amon" is erased, and on some *this does not occur*. No example seems to present any great difficulty of explanation, and it is in the explanation of this variation that the solution of the Syrian problem seems to manifest itself.

The letters concerned may be divided into two distinct types, viz.:—

(a) Letters to, and letters from, monarchs.

(b) Letters from vassal princes to kings and others.

Let us therefore consider the text of the letters from the standpoint already indicated, viz., the religious standpoint.

*Letter 1* is addressed by Amenhetep III to Kadašman-ḥarbe, king of Karaduniaš. There seems to be a very definite reason why this letter should have been found in Egypt, and not at its destination. Its contents show that correspondence had passed between the two monarchs regarding the sending of a princess to Egypt, with a view to marriage either with the monarch himself or, more likely, with the heir. The letter cannot, on any showing, be considered to be couched in tactful phraseology, and if it had been received it might have created a distinctly hostile attitude towards Egypt. Since even as this period disaffection and disloyalty were already beginning to manifest themselves in the dependent states which lay on the remote borders of the Empire, it would have been an unwise policy to provoke hostility among the neighbouring states which were not dependent upon Egypt.

From the letter which Tušratta addressed to the widowed Queen Tiy, and those which he addressed to Amenhetep IV (Akhenaten), it is quite evident that Queen Tiy was a person of considerable importance in the court of Amenhetep IV. It is therefore suggested that, considering the contents of this remarkable letter (No. 1) and the fact that Queen Tiy was anxious to preserve friendly relationship with neighbouring states, as is seen from the Mitannian correspondence, it was she who brought it about that the letter was not sent, but was hidden with the other tablets. It is also very likely that the queen was not anxious for an alliance in marriage of a Babylonian princess with her son, as she seems to have regarded the Mitannian alliance as of supreme importance.

When the tablets were brought out and examined during the reign of Akhenaten in order that the name of "Amon" might be erased, evidently this letter was not produced. It lay hidden at El-Amarna bearing on line 46, clearly written, the forbidden name:

*ilu A . ma . nu . um .* = "Amon." (1) (See below.)

Another letter dealing with the same subject, *Letter 31*, was addressed by Amenhetep III to Tarḥundaraba. Evidently this also was not dispatched.

These letters can scarcely be duplicates as there is no evidence to show that duplicates of letters were made and stored. <sup>a</sup> There does not seem to be any other explanation of the strange circumstance of the preservation of the word "Amon" on this letter; on other letters addressed to Amenhetep III the word "Amon" is obliterated without exception, as the following examples indicate.

There are eleven letters from Tušratta, king of Mitanni (together with two lists of gifts (nos. 22 and 25), which are, of course, of no importance for our present purpose). The influence of the religious movement of El-Amarna is illustrated in a most interesting way in this correspondence.

In *Letter 17*, line 33, Tušratta makes mention of the name of the god Tešub; but it was the name "Amon" which was the forbidden expression at El-Amarna, and the name Tešub was apparently allowed to remain.

The same is found to be the case in *Letter 19*. On line 15 the name Tešub appears and it is not erased, but it is quite clear that on the same line the name "Amon" with the divine ideogram had been interfered with, and a not too successful erasure made. This line is as follows:—

"May Tešub, the Lord, and Amon (establish) it as it is now for ever" (2).

Line 24 of the same letter reads:—

"May Ištar and Amon grant to the heart of my brother a fulfilment of his wish" (3). In this case also the word "Amon" has been partly erased. Lines 75 and 76 of this letter read:—

"And the words which we send, may Tešub, the lord, and Amon lead them (convey)" (4). Here again the word "Amon" had been partially removed.

*Letter 20*, also written by Tušratta to Amenhetep III, contains some interesting points. Line 26 reads:—

"And Amon the god of my brother" (5). The name "Amon" with the determinative is erased, but in line 25 the name "Ištar" is left untouched.

In line 61, Tešub is not erased.

Line 74 reads:—

"May Tešub and Amon grant this" (6). The name Amon with the determinative is erased.

*Letter 21*, from Tušratta to Amenhetep III, mentions the name Ištar on lines 15 and 18, and in neither case is there any erasure. On line 32 he uses the expression: "the gods of my brother." No erasure occurs here.

*Letter 23*, from Tušratta to Amenhetep III, mentions on line 13 the name "Ištar": "Ištar of Nineveh, the goddess of the lands," and the name is not erased. Also on line 26 we read: "May Ištar, the goddess or queen of heaven,

<sup>a</sup> Out of over 340 letters there is evidence that of only two were copies made. At the end of *Letter 23*, addressed by Tušratta to Amenhetep III, there is written in hieratic,

"Copy (of the letter) which the messenger brought"; and at the end of *Letter 27*, addressed by Tušratta to Amenhetep IV, there is written in the same script,

"Copy of the letter from Naharaina."

There is no reason to believe that *Letter 1* is a duplicate, but it is certainly curious that a duplicate of *Letter 27* should have the term *A . ma . a . nu* on line 87.



protect my brother and me." The letter finishes with the curious phrase:—

"Now Ištar is a goddess to me."

"And to my brother she is not a goddess."

In no case is the name Ištar erased, which seems to suggest that only the name "Amon" was the forbidden name; or at least the order was given that the name "Amon" must be obliterated, and the scribes did merely as they were ordered.

*Letter 26*, addressed by Tušratta to the widowed Queen Tiya, carefully avoids all reference to the names of any of the gods. This is remarkable when the frequent use of these names in his letters to Amenhetep III is taken into account. *He evidently realised that a change had taken place at the death of Amenhetep III.*

*Letter 27*, from Tušratta to Amenhetep IV (Akhenaten). Sir Flinders Petrie, in *Syria and Egypt*, places this letter as the last of the Tušratta series; and it would seem from its contents that this position is correct.

The letter shows traces of impatience and disappointment on the part of Tušratta, for evidently Akhenaten had not treated him so handsomely as he expected. Curiously enough, on line 87 there appears an expression, which is not found in any other part of the correspondence which was addressed to the monarch or his mother after the death of Amenhetep III. The signs on the tablet are extremely doubtful, as it is very much broken at this point and the only signs visible appear to be:—

*Tešub u il(u) A [m] A [a . nu] . . .* " (The god) Tešub and the god . . ." (7). The signs may read "Tešub" and "Amon", but it is not possible to say with anything like certainty; the name does not appear to be obliterated in this case. The difficulty arises from the tablet being broken. There is, of course, the possibility that the faint traces of signs may represent Ištar, and thus the text may read "Tešub and Ištar." The term "Amon" may possibly be read; and there is the possibility that the king did not see the letter. The contents suggest that it may have been hidden.

*Letter 28.* This letter is addressed by Tušratta to Amenhetep IV (Akhenaten), and all mention of the names of the gods is carefully avoided.

The same state of things is found in *Letter 29*, also addressed by Tušratta to Akhenaten. No mention of the names of any gods is found.

The letters of Rib-Addi present a curious problem. They show a seemingly loyal prince holding out against powerful enemies. He appeals continually to the Egyptian monarch for help, and though no replies to his letters have been discovered, the letters themselves often furnish the replies. More often than not, no reply was received and no help came, despite his frantic appeals. Evidently some sort of reply did once reach him, for he quotes it in a letter. The reply seemed to have been "Protect yourself"—and he answers "How can he do this?" If such a course had been possible, there seems to be no reason why he should have continued writing to Egypt. There seems to be only one explanation to this problem, and that is that the letters of appeal were hidden from the king, and the foolish reply which he received, viz., "Protect yourself," was the work of some official.

If the king had actually seen these letters, it is very curious that the phrase, "May the goddess of Gebal give might to the king", was permitted to remain in the letters without any erasure. It appears in *Letter 31* and perhaps in *Letter 38*. One can scarcely believe that such a phrase would be permitted with regard to the king of whom the royal scribes wrote (*Letter 162*, line 78), "And mayest thou know that it is well with the king as the sun in heaven".

Again, in twelve of the letters the monarch is addressed as *Šar ta . am . ḥa . ra*, "King of battle". One could scarcely imagine a more inappropriate title for Akhenaten. It cannot be pleaded that Rib-Addi was an ignorant Syrian, who did not know the true state of affairs in Egypt. As a matter of fact, he is quite conversant with the royal title, and addresses the king in almost every letter as:—

*ilu Šamši . ia* or *ilu Šamaš matati*.

"My Shemesh (Aten or Sun)", "The Shemesh (or Aten) of the lands". The ugly fact reveals itself however that even Rib-Addi himself was not absolutely loyal. While he carefully avoids mention of the forbidden name "Amon," which does not appear in any of the 53 letters which he addressed to the king, when he wrote to the nobles at court he pursued another course.

To *Ḥaia* (in *Letter 71*, line 4) he writes, "May *Amon*, the god of the king, give thee might in the presence of the king" (8).

To *Amanappa* (in *Letter 86*, line 3) he writes, "May *Amon*, the god of the king, give thee might in the presence of the king" (9).

In *Letter 87*, line 5, he writes to him again, "May *Amon* and *Ba'alit* of *Gebal* give thee might in the presence of the king" (10).

Though all these three letters evidently belong to the period of Akhenaten, the name "Amon" is not erased in any of them; it stands clearly written on the tablets.

It also appears unerased in *Letter 95*, from Rib-Addi to a noble. Lines 3 and 4 read, "May *Amon* and *Ba'alit*, the goddess of *Gebal*, give thee might in the presence of the king thy lord" (11).

It is evident, therefore, that although these letters which were addressed to court officials were stored in "the place of the records" at El-Amarna, they did not receive the same treatment with regard to the name "Amon" as other letters. The explanation of this seems to be obvious: that Akhenaten did not know of the existence of these letters which contained the forbidden name of "Amon," or the name would have been erased; and since these letters were hidden, it is very likely that the other letters of Rib-Addi to the monarch himself, dealing with the same subject and making the same appeal, were also hidden. The opening phrases, "May *Ba'alit*, the goddess of *Gebal*, give might to the king", "The king of battle", and such passages as, in *Letter 116*, lines 63 ff., "and behold, the gods, and *Šamaš*, and *Ba'alit* of *Gebal* have granted thee to sit upon the throne of the house of thy father over thy land", must have made the letters abhorrent to Akhenaten, and therefore the officials either from fear or disloyalty hid them.

The letters which *Aziri* addressed to Akhenaten carefully avoid any mention of the name "Amon." *Aziri* was obviously disloyal to Egypt, but evidently desired to keep on good terms with his overlord until he had secured his own position as a rebel.

In one of his letters to *Dudu*, a court official, however, *Aziri* gives a slight hint of his disloyalty. In *Letter 164*, line 40, he writes, "... to my gods and the god A" (12). It seems fairly evident that "A" stands for *Amon*, as the form of the letter makes "Adad" impossible. From these facts, therefore, it seems possible that the true position in Syria was not made known to Akhenaten, that the letters from the Syrian chieftains were not read to him, and that disloyalty prevailed among all the chieftains and even among the court officials. Letters were addressed by the chieftains to court officials containing the name

J. R. TOWERS

(1) = ilu a. ma. nu. um.

(2) = ilu tešub...u ilu a ma. nu. um (Kt 19.15 BB8)

(3) = ilu gštar u ilu a. ma. nu. um (KHK 9.24 BB 8)

= ilu tešub be.e.li u ilu a.ma.mu.um li.miš.šer.šu  
 .nu.ti.ma. (KH 19.75-76 BB 8)

(KN 20.26 WA 22)

=  $\frac{1}{2}$  kështu si  $\frac{1}{2}$  a ... me li. id. din. ma.

(K 20.74. WA 22).

𐎎𐎗𐎕 𐎎𐎗 𐎎𐎗𐎕𐎎𐎗 𐎎𐎗𐎕𐎎𐎗

(7) = *ilu* *kešub* u *ilu* .....

(K 27.87. WA 23).

(8) 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗

= *ilu* a.ma.ma *ilu* ša šar[ri] (KN 71.4 WA 72)

(9) 𐎎𐎗 𐎎𐎗 𐎎𐎗

= *ilu* a.ma.... (KN 86.3. BB 21) Broken tablet

(10) 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗𐎕𐎎𐎗 𐎎𐎗 𐎎𐎗𐎕

= *ilu* a.ma.ma u *ilu* bēlit (KN 87.5. BB 22)

(11) 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗𐎕  
𐎎𐎗𐎕 𐎎𐎗 𐎎𐎗𐎕 𐎎𐎗𐎕𐎎𐎗 𐎎𐎗𐎕

= *ilu* a.ma.ma u

u *ilu* bēlit ša *ilu* gub.la (KN 95.3-4. WA 70)

(12) 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗𐎕𐎎𐎗 𐎎𐎗𐎕 𐎎𐎗 𐎎𐎗 𐎎𐎗 𐎎𐎗

= a.ma ilāni.ia u a.ma *ilu* A. (KN 164.40 WA 38)

KN = EL AMARNA TAFELN. J.A.KNUDZON

WA = THONTAFELFUND I-III H. WINCKLER.

BB = TEL EL AMARNA TABLETS. C BEZOLD AND WALLIS BUDGE.

□ INDICATES SIGNS DELIBERATELY CRUSHED OUT.

## REVIEWS.

*New Light on the Most Ancient East, the Oriental Prelude to European Pre-history.* By Professor V. GORDON CHILDE. 1934. (London: Kegan Paul, Trench, Trubner and Co., Ltd.) 15s.

In these days of many excavations in practically all the countries of the East—even including China—it is of inestimable value that a general stocktaking of the knowledge gained should be made by so competent an authority as the writer of this book. The field-worker inevitably has a bias with regard to the relative importance of his particular “dig” and the country in which he is working in the general picture of the prehistoric past. Professor Childe, however, is able to look at the wood without the nearer trees assuming a disproportionate size. But he is no armchair archaeologist; he has seen—though he has taken no direct part in their excavation—many of the most important ancient sites, even as far east as the Indus valley. He well realises that to see a pottery jar drawn on paper does not convey nearly as much to the student as to hold it in his own hands outside the museum case.

The general plan of this book is well calculated to clear a way through the great mass of relevant and essential details; though he gives them in large numbers Professor Childe marshals these details so ably and in so orderly a manner that any fogginess is avoided. We are taken to the three great river valleys of the East in turn, the valley of the Nile, the Euphrates-Tigris valley, and the much more extensive plain of the Indus. To one who has had the unique privilege of spending long seasons in all three river valleys at excavations actually in progress, these chapters are of absorbing interest.

Proceeding to the discussion of Iran and the Assyro-Syrian and Armenian land-masses between and to the north of these great valleys, Professor Childe draws attention to the fact that “the archaism of (these) provincial regions” “may preserve elements from the earlier phases” of the more progressive cultures of the riverine plains: to those regions we may look for interesting lights on the earlier stages of the greater civilizations.

The final chapter on “The Mechanism of Diffusion” lucidly sums up the general impressions on that all-important subject that arise from the great mass of evidence garnered in these last few years.

A few minor errors, such as “the Nilghary Hills of Kashmir” (p. 210), serve, like the irregularity in an Eastern rug which emphasizes the fact that “Allah alone is perfect,” to draw attention to the general excellence of the whole. The book is couched throughout in terms of admirable moderation, save only where (p. 157) “an imposing citadel” and “town” emerge from the three small low mounds of Jemdet Nasr.

There seems every prospect of a great renewal of archaeological activity throughout the Orient during the next few years. A periodical stocktaking such as Professor Childe’s would be most helpful.

D. MACKAY.



*The Dawn of Conscience.* By JAMES HENRY BREASTED. 431 pp., 19 pls. 1934. (New York and London: Charles Scribner’s Sons.) 12s. 6d.

Professor Breasted’s book is a disappointment. Though more ambitious in scope and size than his *Development of Religion and Thought in Ancient Egypt*, it has not the arresting quality of that work. This is probably because the author has attempted to cast his net too wide. Had he confined himself

to the dawn and development of conscience in Ancient Egypt only, the book would have merited unstinted praise. But when he claims that the sense of moral guilt began only with the written word he is demonstrably wrong, for conscience can be found in an elementary form among the lower animals. This being the case, it is obvious that in the millennia preceding the invention of writing conscience had not only dawned but was sufficiently developed to be formulated and set down when writing became possible. When Professor Breasted deals with documents his opinions must always command respect; it is only when he tries a reconstruction without documentary evidence that he fails. He has, however, done great service to all thoughtful readers by showing how much the religious and ethical ideas of ancient Egypt influenced the Hebrew Scriptures, and through them the whole of the modern world. Though this is a subject which has already claimed the attention of many scholars, it has not hitherto been given to the world in so sympathetic and attractive a form.

M. A. MURRAY.

*Studies in the History of Culture, No. 1. The Script of Harappa and Mohenjodaro and its Connection with Other Scripts.* By G. R. HUNTER. Pp. 210, pls. 37. 1934. (London: Kegan Paul, Trench, Trubner and Co., Ltd.) 21s.

The author cannot be congratulated on this book. To publish by photography the uncorrected typescript of a Ph.D. thesis is hardly complimentary to his readers. "Polysyllabic," "Mohenjodard," "50" instead of "so," may be typist's errors, but that they remain in the published script points to gross carelessness in correction. Again, the spaces left for the insertion of the hand-written signs are so wrongly calculated that long blanks are often left; p. 37, for example, should have been entirely re-typed before publication. As the book is ostensibly on the script of ancient India and its connection with other scripts, the reader has a right to expect that the Indian signs should be drawn in exact facsimile and not in the rough-and-ready shorthand which the author probably used in his own notebooks. That the sign  with its beautiful curves and delicate widening of the lower strokes, should be travestied as  both in the script and in the plates, does not permit of any real comparison. The Egyptian hieroglyphs, with which the author compares the Indian script, are equally caricatured. When the presentation of the subject is so careless and inadequate it is difficult to think that the author's conclusions can be of value. He offers little more in this volume than has already been given to the world by competent scholars in "Mohenjodaro and the Indus Civilization," edited by Sir John Marshall. He claims to have discovered case endings, but in view of the general carelessness of his work as shown in his book, even this claim should be regarded with some caution. At present our knowledge of the Indian script is confined to seals and other small objects, which probably present nothing more than proper names. Until a great deal more material, preferably an inscription of some length, is available, a book such as this is necessarily superfluous.

M. A. MURRAY.

*Un Socialisme d'État Quinze Siècles avant J.-C.* By SERGE DAIRAINES. Pp. 167, no illustrations. 1934. (Librairie Orientaliste Paul Geuthner, 13, Rue Jacob, Paris (VI<sup>e</sup>).) Frs. 36.

The central idea of this book is not connected sufficiently with its subject-matter, most of which, in fact, is left quite unrelated to it. There is no exposi-

tion of the chief aspects of state socialism, and so none of the actual character of that of the Egyptian XVIIIth dynasty.

It is also a mistaken idea. State socialism could not exist in an age as limited in material knowledge and development and imaginative width as the one in question, when there was no scope for the direct swaying of the material conditions, outlook, and behaviour of a people by its rulers. The control of the economic and social life of the people, remarkable though it was, was the mere order of strong autocracy, and was not inspired by ideas of a particular political idealism.

The XVIIIth dynasty was not the greater for being the first to realize the value of Justice, as justice in a ruler is in exact proportion to the nobility of his ideas, and is meaningless as a particular ideal. As M. Dairaines admits, the ideal of justice was thus emphasised because the democratisation of religion now necessitated the Pharaoh's basing his power to a certain extent on his importance to his country.

A meaningless expression, apropos of the Pharaohs' ideas of justice and liberty, is: "... (l'art de cette époque) qui dans toutes ses manifestations révèle sous la XVIII<sup>e</sup> dynastie un abandon de l'art réaliste des précédentes époques en faveur d'un art qui suggère plus qu'il n'exprime réellement."

There can be little doubt that the absence of great art and great ideas of any kind in the New Kingdom means that it was an age of comparative spiritual decadence even in the first half of the XVIIIth dynasty: its best period. Old Kingdom slaves may well have lived better lives than XVIIIth dynasty free men; and there can be no question about the cultured classes.

However, the book is very clearly written, well-balanced and complete. As a review of every aspect of the state's structure it is admirable in every way, above all in that it shows the relative importance of the things it describes. The main theme of the need for and the nature of the autocracy and its struggle with disruptive tendencies is treated well, though not very deeply. It is rather vague, however, when dealing with Akhenaton, whose importance, also, it over-emphasises.

R. M. COX.

*A Short History of Ancient Egypt.* By ARTHUR WEIGALL. Pp. 280, pls. 15. 1934. (Chapman and Hall.) 8s. 6d.

A short and concise history of Egypt has been a long-felt want. All Egyptian histories hitherto have appealed only to advanced students, but Mr. Weigall's volume is intended for the interested layman. Mr. Weigall's writings have always shown a vivid sense of the picturesque and a human quality which make his books worth reading. This, his posthumous work, is no exception to that rule. It is well written; and even the later periods of the history, which are shirked by most historians, are made alive. Take, for example, the description of Psametek I, "his portraits show him to have been in later life a shrewd and business-like personage, with a long nose, a canny eye, and a plump and prosperous appearance about the cheeks and chin." The book is too short to allow of more than the broad outlines of historical events, but these are given pleasantly and accurately. The minor inaccuracies, *e.g.*, labelling pl. XV "Luxor" instead of "Dendera," are probably due to the fact that the author did not live to make the final corrections.

M. A. MURRAY.

## JOURNALS

QUARTERLY OF DEPT. OF ANTIQUITIES, PALESTINE ; III, 3. 1933. (London : Milford.) 5s.

ILIFFE, J. H.—*Nabatean Pottery from the Negeb*.—Nabatean pottery of the Hellenistic period has now been found in the Negeb between Beersheba and Kosseima, where hitherto only Byzantine remains had attracted attention. From the IVth century B.C., the Nabateans, an Arab race, grew wealthy by reason of their position on the trade routes across Arabia. They wrote in Aramaic, adopted Greek culture, and built remarkable temples, tombs, houses, and amphitheatres, chiefly at Petra. They also made a pottery of fine texture and decoration. The kingdom was reduced by Trajan to part of the Roman colony of Arabia ; but Nabatean art lived on, and had a wide influence even into the early days of Islam. Nabatean sherds had already been found near Gaza, the Mediterranean terminus of the trade route through Petra from the Persian Gulf and Arabia.

Do. ; III, 4. 1933.

JOHNS, C. N.—*Excavations at Pilgrims' Castle, 'Atlit (1932) ; the Ancient Tell and the Outer Defences of the Castle*.—Evidence has been found that the site was occupied at the transitional period between the Middle and Late Bronze Ages, *i.e.*, in the XVIth and XVth centuries B.C., and that it remained in occupation practically continuously to the end of the Roman period.

An interesting resumé gives the main finds at some fifteen sites in Palestine that were excavated in the season 1932-3 by the Department of Antiquities, and by British, Jewish, American, French and Danish expeditions. A bibliography of these excavations follows.

PALESTINE EXPLORATION FUND. Quarterly. April, 1934.

CROWFOOT, J. W.—*An Expedition to Balu'ah*.—The find of a rude basalt slab at Balu'ah in Moab led to an examination of the site. The pottery found dated chiefly from the Early Iron Age, c. 1200-900 B.C., though a few sherds point to an occupation earlier than 2000 B.C. The Kasr and ruined houses are comparatively late and of no great interest.

GARROD, D. A. E.—*Excavations at the Wady al-Mughara, 1932-3*.—In the Tabūn (Oven) cave, work has been carried down to Layer Tabūn G, which rests immediately on bedrock. This layer appears to correspond with Breuil's Tayacian II, occurring below a bed containing Acheulean hand-axes.

ENGBERG, R. M., and SHIPTON, G. M.—*Another Sumerian Seal Impression from Megiddo*.—Three animal cylinder seal impressions appear to date from the Early Dynastic Period of Sumer, *i.e.*, the beginning of the third millenium B.C.

GASTER, T. H.—*The Beth-Shemesh Tablet and the Origins of Ras-Shamra Culture*.—The discovery at Beth-Shemesh of a tablet written in Ras-Shamra script lends a measure of support to the writer's view that the Semitic civilisation of Ras-Shamra (Ugarit) was imported from the Negeb and the Sinai peninsula. A summary is given of the evidence for this view.



ANNALS OF ARCHAEOLOGY AND ANTHROPOLOGY—UNIVERSITY OF LIVERPOOL.  
Vol. XX, Nos. 1-4. 1933.

GARSTANG, J.—*Jericho: City and Necropolis*.—A further series of tombs of the Middle Bronze Age is described. A preliminary account of the investigations in the Palace Area mentions fifty-eight store-rooms built at the beginning of the Hyksos period. The products of Middle Bronze II art "disclose the later Hyksos period as the brightest phase in the history of Canaanitish civilisation."

BURTON, T. B.—*Anatolian Relations with the Ægean before 2400 B.C.*—By the evidence of the pottery it appears that the greater part of the Bronze Age civilisations of the Ægean, of the western coast of Anatolia, and of Cyprus before 2400 B.C. was brought by sea from the eastern end of the Mediterranean, and not from Anatolia.

CAMPBELL THOMPSON, R., and MALLOWAN, M. E. L.—*British Museum Excavations at Nineveh, 1931-2*.—The excavation of the Temple of Ishtar and the large pit dug down some 90 feet through the mound of Kouyunjik to virgin soil were the main features of the season's programme. Mr. Mallowan deals with the stratification, Dr. Campbell Thompson with the inscriptions, and Messrs. Dudley Buxton, Beck and Harden contribute notes on bones, and beads, and glass respectively.

MAN. November, 1933.

O'BRIEN, T. P.—*Chalcolithic Cave Site in North Syria*.—A cave in a small ravine near Tell Jedede, halfway between Aleppo and Antioch, was excavated in September, 1932. Black hand-made pottery, burnished and incised, a Neolithic lance-point of flint, and obsidian flakes were among the finds. Human bones were too fragmentary for exact study.

GARDNER, E. W., and CATON-THOMPSON, G.—*Kharga Expedition*.—Geological problems outstanding from season 1931-2 were cleared up by Miss Gardner in the last of the three seasons' programme of prehistoric research in the oasis. Important finds of palaeolithic tools were made. A note is added by Miss Caton-Thompson on the necessity for some revision of the Antiquities Laws of Egypt and elsewhere "to safeguard the rightful claims of national collections without hindering the advance of scientific prehistoric research."

DO. February, 1934.

CATON-THOMPSON, G.—*The Camel in Dynastic Egypt*.—A twist of hair-cord from gypsum quarries in the northern Fayum scarp excavated in 1927-8 shows the camel to have existed in Egypt in the early Old Kingdom.

THE METROPOLITAN MUSEUM OF ART, NEW YORK: A GUIDE TO THE COLLECTIONS. Part 1: *Ancient and Oriental Art*. 1934. (London: Bernard Quaritch, Ltd.) cents 25.

The Guide to the Collections has been divided into two parts and rearranged with a view to providing the visitor with "a more logical and instructive way of seeing the several departments." For each department a short survey is given of the history of the art to be studied there, with a plan of the galleries, followed by brief statements of the significance of the most important exhibits in them: a page and an illustration for each room.

D. M.

## NOTES AND NEWS.

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We propose to resume the publication of Egyptian portrait-statues which was so marked a feature of *Ancient Egypt* in its early years.

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A Lantern Lecture on Recent Discoveries at Gaza, Palestine, will be given by Professor Sir Flinders Petrie, F.R.S., at University College, Gower Street, W.C.1, on

Thursday, June 14th, at 3 p.m.,  
and will be repeated on  
Saturday, June 16th, at 3 p.m., and  
Tuesday, June 19th, at 5.30 p.m.

The lecture is open to the public without fee or ticket.

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In Egypt, the further examination of the site of Tell el-Amarna by Mr. Pendlebury for the Egypt Exploration Society has yielded some interesting finds; notably, a letter from Akhenaton to the Governor of Ascalon and fragments of dictionaries. For the Sir Robert Mond Expedition to Arment Mr. Oliver Myers has completed the excavation of the Buccheum, and has also done some work on a prehistoric cemetery. A full report of the many important finds is shortly to appear.

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From Palestine, Miss Dorothy Garrod writes: "I am starting what is to be the last season of work in the Wady Mughara caves, and my object is to explore thoroughly the lowest layers (Acheulean and Tayacian) of the cave known as the Tabūn, the largest of the group. These layers were reached in a sounding last year, and promise to be of great interest for the study of the Lower Palaeolithic in this region."

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In 'Iraq the excavations of Ur have been brought to a close after twelve seasons. Even yet it is hard to assess the great value of the work of Dr. Woolley and his colleagues. Not only has our knowledge of history been widened beyond all anticipation, but the spectacular discovery of the Royal Tombs and of the scenes enacted at the burial of the Sumerian monarchs has aroused public interest in archaeological exploration to a degree only equalled hitherto on the occasion of the discovery of the tomb of Tutankhamen.

A second book of the Ur Excavations series has just been published, at the remarkably reasonable price of three guineas, thanks to the munificence of the Carnegie Corporation of New York. *The Royal Cemetery*, though intended for the serious student of archaeology, is a book also for the student of art: the coloured reproductions by Miss Louise Baker of many fine examples of Sumerian art most ably assist Dr. Woolley's gifted pen to convey the remarkable development of the arts and crafts in those ancient times.

Two important little exhibitions have recently been held in London.

1. In the Nineveh Gallery of the British Museum. Arpachiyah, a mound near Nineveh, was excavated by Mr. Mallowan for the British School of Archaeology in 'Iraq. His finds show two main periods, in the earlier of which pottery of the well-known Tell Halaf culture was a conspicuous feature.

2. At the Courtauld Institute, Portman Square, a small but extremely interesting collection of Chinese antiquities has been on view. The objects are chiefly from the Old Lo-yang tombs, but unfortunately they were not excavated scientifically; much of their value is therefore lost. The jade buckles and other jade objects are exquisitely carved in delicate relief, and the glass beads and vases with glass decoration show that the making of glass in China extends to a period several centuries anterior to the date usually accepted as the time of its introduction into that country. The chief exhibits were published in the *Illustrated London News* on October 8th, November 4th, December 9th, of last year, and the glass on May 12th, 1934.

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It is announced that what was previously the Sixth Egyptian Room at the British Museum is now reopened as the Babylonian Room. The treasures from the Royal Tombs at Ur occupy a prominent position in the chronologically arranged exhibits.

## OBITUARY.

### FRANCIS LLEWELLYN GRIFFITH.

1863-1934.

THE loss of my oldest Egyptian companion, Professor Griffith, brings back a history of work which has been passed over in the notices recently published on his life. As there is no-one else to remember those days, it is fitting that they should be recorded here, though other writers have given an outline of his later life.

In 1884 I had a letter from a young man whose love of hieroglyphics overshadowed his training for law. Writing to Miss Edwards, who was the main-spring of the Egypt Exploration Fund, I urged that "I will do everything in my power to ensure such a chance" of growing an English Egyptologist. The subject was not yet popular, and there was a dearth of aspirants in England. The Exploration Committee agreed to Griffith joining me, and so began his Egyptian career. We settled at Naukratis on December 1st, 1884, a site which I had found in the previous season, and we began to clear up the Early Greek material which was then so little known. It was the first view of the Greek in Egypt before Alexander. Piles of scraps of Greek vases and dedications from 650 B.C. and onward, architectural fragments, and foundation deposits were the spoil which opened new vistas, to say nothing of the hoards of coins, the tools and the weights, all covering new ground. It was a fine varied training for both of us, especially as it was so new that the usual classical scholar could not help us.

The next season Ernest Gardner took over Naukratis as his opening in such life, while Griffith and I went on to the Eastern Delta. There we found the temple of Am Pehu, Tell Nebesheh, after which Griffith turned to neighbouring sites, while I went on to Defenneh. From Nebesheh he went with Sayce exploring for a month the Eastern way to Palestine in April and May, 1886.

In 1886-7 we joined in a small boat, and went up the Nile from Minieh to

Aswan: this I have described in the volume of studies presented to Griffith last year; we published a joint volume of inscriptions from that trip. On returning north I stayed for survey at Dahshur, while Griffith left me on February 22nd, 1887, and joined Naville in work at Tell el-Yehudiyeh. From there he left on March 30th for a long trek along the road to El Arish, which he described in detail in "The Mound of the Jew." In that he inveighed strongly against the destructive working methods of most excavators, and insisted that full attention should be given to all the remains. He was a thorough archaeologist in his mind, though withdrawn later to give his energies to philology.

In May, 1887, he copied the Dronkeh tombs which we had seen in going up the river. In 1887-8 Griffith excavated at Terraneh in the western Delta, went on to Heliopolis in December, and explored further on the eastern side. In the summer of 1888 he was recruited by Franks for his Department of the British Museum, and submerged in general archaeology.

When I settled at University College, 1892, Griffith came to lodge with me in Torrington Square, and we worked up the publication of the Egyptian Tales. I left him there when I went off to Koptos. In the summer of 1896 there came a very strong influence on his whole life, from his marriage to Kate Bradbury. She had been the companion of Miss Edwards in her lecturing tour in America of 1891, had nursed her through the trouble of her broken arm, and brought her home. It was the strain of lecturing when crippled by that accident which so weakened Miss Edwards that her death followed soon after her return. Miss Bradbury, the only child of a prosperous mill owner in Lancashire, gave her life seriously to archaeology, was brought on to the Exploration Committee, and took an active part in those matters. She tried to keep affairs straight, and looked to Griffith to give voice in the Committee, which he was loath to do. "Oh, I could shake him!" she used to say when deploring his silence. After four years of this they married, and she was devoted to furthering his work in every way. Her death a few years later marked the end of a period, that of Poole, Newton, Miss Edwards and the older connections. Henceforward the new interests which surrounded his second period belonged to this century rather than the last.

All the wealth of work on Hieratic, Demotic, and Nubian which he explored so successfully has been outlined in many recent obituaries which have appeared, but his first twenty years of activities should not be lost to sight in estimating a character so reserved, so silent, so strenuous, which undoubtedly developed much in his second period.

FLINDERS PETRIE.

#### PROFESSOR T. E. PEET.

1882-1934.

The death of Thomas Eric Peet at the age of 51 is the more tragic in that his biggest opportunities, both of service to Egyptology and of a rich and many-sided personal life, were only just coming to him. At Oxford he had read Mathematical as well as Classical Mods. before he took a Second in Lit. Hum. The Craven Fellowship, which followed, took him to Italy, and *The Stone and Bronze Ages in Italy and Sicily* which was the result is still the standard work on its subject. He did not reach Egypt till 1909, and it was not for another year that he began to apply himself to the linguistic study which later dominated his research work. The breadth of his early training was amply justified in his Egyptological publications. After Hall's death, he was the only trained historian of his generation; and he alone of them was capable of an edition

of the Rhind Mathematical Papyrus which mathematicians outside his subject would accept. But he had passed straight from an arduous life of excavation, and field service throughout the war, to teaching at Liverpool, and there was necessarily much work to be done to catch up with his outstanding contemporaries. His appointment to Oxford last year was the public recognition that he now stood beside them. It was clear that there were to be great opportunities for developing the School at Oxford; and he must have known that every Egyptologist in the country saw in him the man best equipped to grasp the opportunity. And there would be leisure as never before for further research and publication of his own.

Peet's claim to the first rank among Egyptologists in this country is patent to all who will mark the accurate and conscientious scholarship, the ability and, above all, the wide viewpoint of his published work. He had many outside interests, including music and lawn tennis, all of which he pursued with a competence that was out of the ordinary. By every testimony a great teacher, as a man he was reserved, modest, and therefore difficult to know. Exciting to talk to, likeable from the moment one met him, he did not easily express a generous regard which was at the root of his nature, or accept the affection he quickly roused. It was, perhaps, only after staying in his home that it was possible to know the strength of his friendship.

S. R. K. GLANVILLE.

#### MR. ALBERT M. LYTHGOE.

In the death of Mr. A. M. Lythgoe after a long illness Egyptology has suffered yet another serious loss. For many years Director of the Metropolitan Museum of Art, New York, and head of its Egyptian Expedition, he was the mainspring of American archaeological effort in Egypt; and his periodical visits there with his charming wife were looked for by the archaeologists of other nations with equal interest. The strong support he gave to British as well as to American excavators at the time of the strained relations with the Egyptian Government concerning the tomb of Tutankhamen will long be remembered with gratitude. Though his output of published work was not very large, his wide knowledge and his enthusiasm, combined with a very kindly personality and marked administrative ability, carried the American contribution to Egyptology far.

#### PERE ALEXIS MALLON, S.J.

The death of Père Alexis Mallon, S.J., has created a gap in the small band of Coptic scholars. Though his Boheiric Grammar was published in 1904, a generation ago, it has not been superseded and still holds the field. During the last few years he directed the excavations at Teleilat Ghassul on the east side of Jordan. A short account of his work there appeared in this Journal in 1931.

#### DR. DAVIDSON BLACK.

The death of Dr. Davidson Black at the early age of 49 is a great loss to science. Though he had already made in 1929 the remarkable find of Peking man, *Sinanthropus Pekinensis*, he was convinced that he was only at the beginning of the discoveries to be made in the fossil deposits at Chou Kou-tien. He had been looking forward to taking up work there again with the European and Chinese colleagues to whom his enthusiasm was so great an inspiration.





QUEEN TETY-SHERY (SIDE VIEW).  
(By Courtesy of the Trustees of the British Museum.)

# ANCIENT EGYPT AND THE EAST

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## QUEEN TETY-SHERY.

(Continued from p. 6.)

The back of the statuette of the queen is extremely interesting, both for the modelling of the neck and shoulders and for the method of dressing the hair. It is rare to find undercutting and open-work in Egyptian sculpture, and this is, as far as I know, unique in a royal statue though it occurs in the small figures of the Middle Kingdom, which are often regarded as dolls. The delicacy of modelling in this statuette is not confined to the front of the figure, but is equally fine at the back. The nape of the neck and the set of the shoulders convey the sense of extreme youth as vividly as the face, and show that the sculptor was as true an artist as any of the earlier periods.

The hair-dressing has a singular importance. In the photograph the wing of the vulture can be seen falling down at the side of the face ; the wide tail spreads over the back of the head ; and the claw holds the *shen*-sign. The hair is possibly a wig, but it is equally possible that it is not. A heavy tress falls on each side of the face, the hair is then cut in a curve to arch over the shoulders, which it leaves clear ; and at the back a long tress hangs down to each shoulder-blade. The back of the head is shaved from the neck to above the occipital prominence, and there the long hair of the upper part of the head is turned in over a pad. The effect is that of the royal heads in the art of El Amarna. In



FIG. 1.—INSCRIPTION ON THE BACK OF THE QUEEN'S THRONE.

(By Courtesy of the Trustees of the British Museum.)



this statue there is no question of head deformation ; the form is clearly due to the method of dressing the hair. The shape of Nefert-yti's head, and perhaps that of her daughters', is probably due to the same cause, but the Amarna ladies wore the pad lower down on the head—below the occipital prominence—and brushed the hair smoothly over the pad ; the sculptor was therefore obliged to represent the queen's head as if deformed.

The inscription at the back of the throne (fig. 1) reads *nesi Sen-sneb . . ankh . .* The first words appear to mean "Belonging to Sen-sneb," which seems to refer to the ownership of the statuette. Such an inscription is unique in Egypt ; a statue being a religious object had no secular owner. It is possible, however, that Sen-sneb is the name of the sculptor, for the broken part of the inscription was probably *s-ankh ren-s*, "who perpetuates her name." If this be the case, the statuette is one of the rare works of art signed by the ancient Egyptian artist.



FIG. 2.

(By Courtesy of the Trustees of the British Museum.)

The inscriptions at the sides of the throne (fig. 2) have few points of interest. On the left side is the usual prayer to Osiris for food and for the breezes of the North-wind. On the right side, the prayer is to Amon, Lord of Karnak. This god is rare in funerary prayers, and the mention of his name shows that the statuette is Theban in origin ; the request is for the daily offerings which "go forth" on the altar of Amon.

The upper portion of a limestone stele (fig. 3) (now at University College, London ; published in hand-copy by Winlock in *Ancient Egypt*, 1921, p. 15) bears part of an inscription commemorating the restoration of a temple or a chapel by

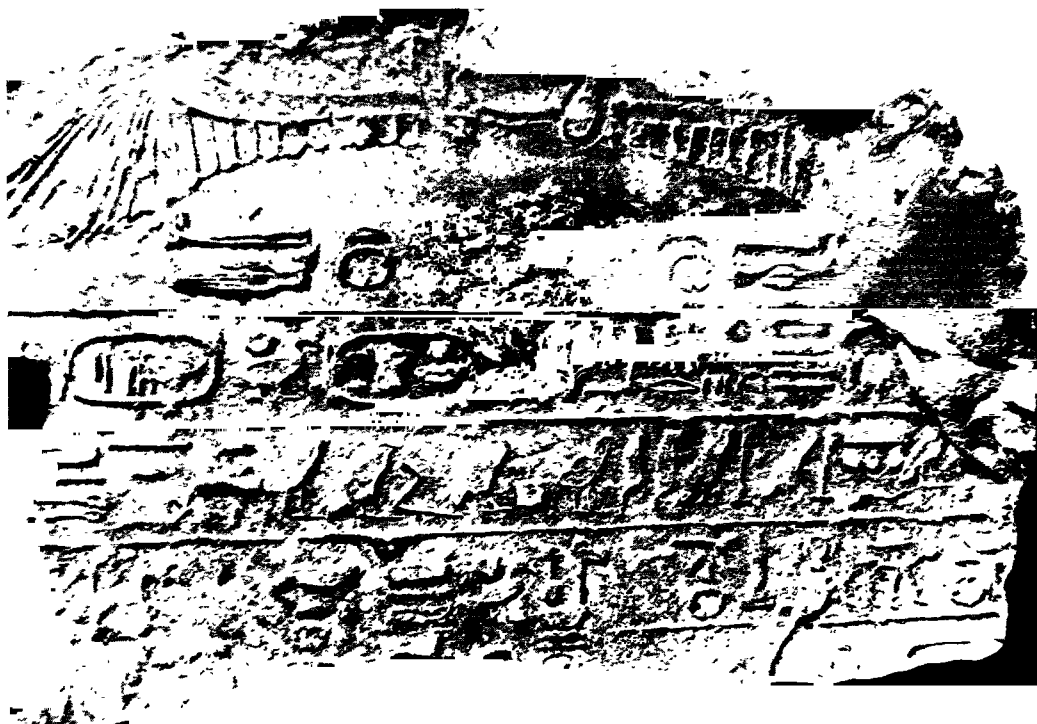


FIG. 3.

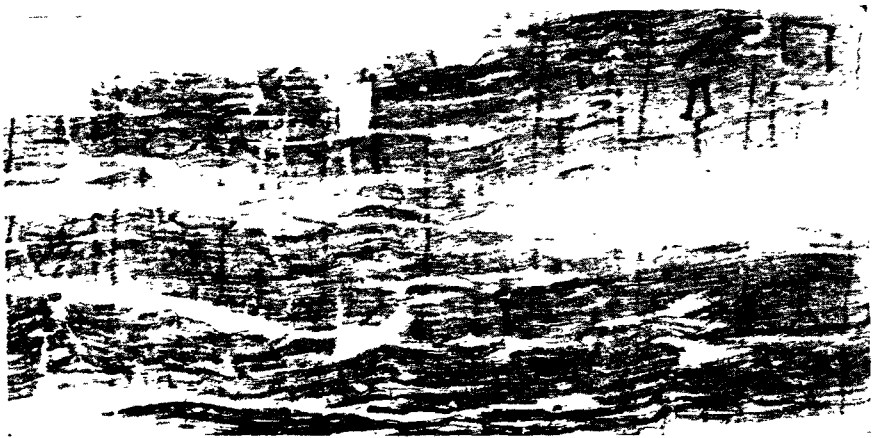
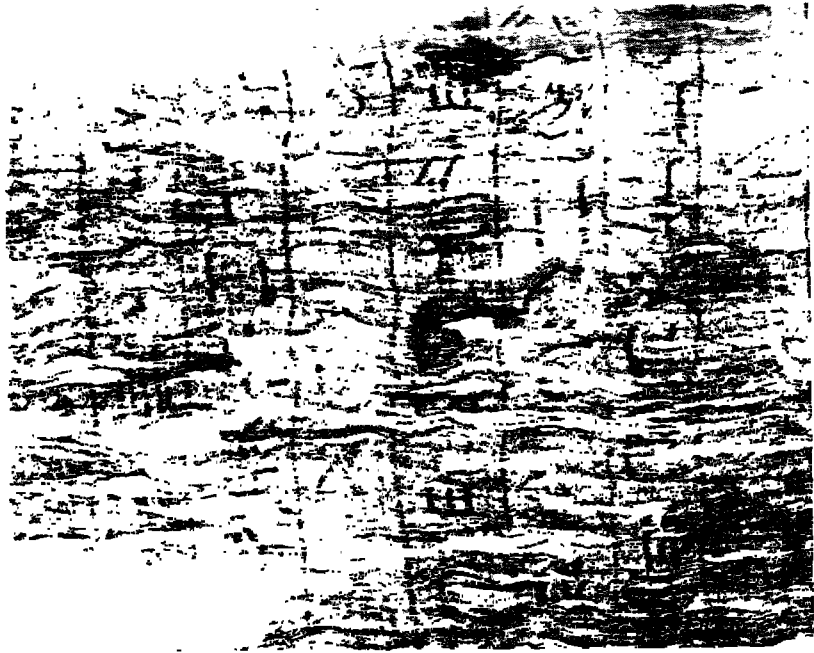
Aahmes I, who "built this wall anew as his monument to his father Mentu, Lord of Thebes, the Bull in Hermonthis." The top of the king's white crown is visible, showing that he stands face to face with the god, of whom only the extreme tips of the tall feather headdress remain. Behind the king is the "King's Mother," whose name was in a horizontal cartouche. In this a  $\triangle$  and the tip of a  $\nabla$  are still visible in such a position that the name can only be that of Tety-shery.



FIG. 4A.

(By Courtesy of the Dept. of Antiquities, Egypt.)


Winlock (*Journal of Egyptian Archaeology*, X, 1924, p. 246) has made a careful study of the history of Tety-shery from the few objects concerning her which still survive. In his article in *Ancient Egypt* quoted above, he calls attention to the importance of Tety-shery during the reign of Aahmes I, and



FIGS. 4B, 4C.

(By Courtesy of the Dept. of Antiquities, Egypt.)

also to the fact that at her death Aahhotep became the chief queen, Nefertari succeeding at Aahhotep's death ; " for about a century the royal family was to all intents and purposes a virtual matriarchate." This can be explained if the Kingship was vested in the husband of the queen, marriage with the chief royal lady constituting his right to the throne. In such cases consanguinity in the closest degree of relationship was no bar to marriage. As the number of royal wives does not appear to have been limited, a king could marry all the other heiresses to the crown during the lifetime of the principal queen. It is therefore possible that Aahmes I may have been married to Tety-shery, Aahhotep and Nefertari at one and the same time.

Figs. 4A, 4B, and 4C are the inscribed bandages from the mummy of Tetyshery. The first line on the right in 4A shows only the  of the queen's name, and below are the words, "Born of the Lady of the House, Neferu, begotten of. . . ." Of the father's name only the final letter remains, in the next line. 4B is perhaps the most important for the identification of the bandages with the statuette. In the second line from the right are the words, "The King's mother, Tetyshery, born of the Lady, . . .," the rest being broken. 4C gives the mother's and the father's names in the first line from the right, "(The Lady) of the House, Neferu, . . . the judge (?) Thenen." M. A. MURRAY.

## NOTES ON GLAZED STONES.

### PART I.—GLAZED STEATITE.

*Glazed steatite*, *burnt steatite*, and *painted steatite* are names which have been applied to steatite which has had its surface altered by some chemical process. This has been done by at least three different methods. The first was to apply a vitreous glaze to the surface and then fire it. This is true glazed steatite; it is hard, and even when the whole layer of glaze is flaked away a very hard surface is left on the steatite. The second method was either to apply an alkali only and fire it, or else to apply a glaze which was of such a nature that it almost always flaked entirely away and left a very soft surface on the steatite. The third method, which is perhaps only a modification of the second, was to whiten the surface, probably with an alkali only, and after heating to paint on a pattern. The effects of the various processes on the stone are different. These processes and the methods of producing some of them are described later.

All the Egyptian specimens of glazed steatite belong to the first type, although a great many have no glaze remaining. The specimens from Taxila also belong to this type.

The seals from Mohenjo-daro and Harappa, some early seals of a similar nature from Kish and Ur, a broken cylinder seal of an early date from Ur, and the great majority of the steatite beads from Harappa belong to the second type; whilst the third type comprises only a comparatively small number of important beads from Harappa.

The first type I call *glazed steatite*; the second has been called *burnt steatite* and for want of a better name I am using this term, although I am not certain that in all cases great heat was used. The third type, *painted steatite*, had a pattern painted with ferruginous clay or some salt of iron on the previously whitened surface. In this case also I am not certain that any great heat had been applied.

The Indus valley appears to have been the great centre for the manufacture of articles of steatite which had the surface whitened by some chemical process. Almost all the animal seals from Mohenjo-daro and Harappa are steatite, as well as the great majority of the beads from Harappa. Not only in their number and variety, but also in their extreme beauty and perfection of execution, they excel the steatite work from all other countries.

Steatite which has been treated in this way has up to the present been reported only from Egypt, Mesopotamia and India. It is a surprising fact that although relatively common in Egypt it has not been found in any of the other countries bordering on the Mediterranean. One would expect also to find it in Persia where numbers of steatite seals are found, but all that I have seen are made of the natural stone with no sign of chemical treatment.

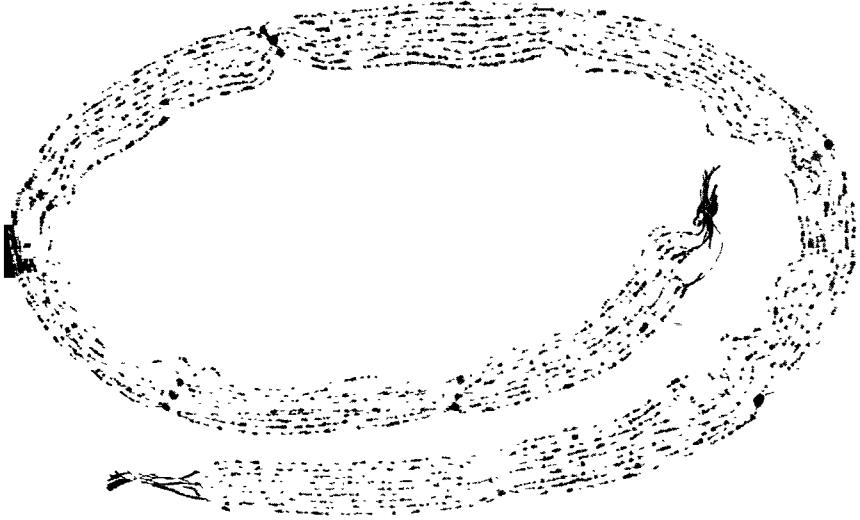


FIG. 1.

 $(\times \frac{1}{4})$ 

A series of specimens ranging over a long period of time have been selected and examined: from Egypt, five Badarian, five Predynastic, one Old Kingdom, one First Intermediate, one XIIth dynasty, and two unglazed specimens (one Badarian and one Predynastic); from Mesopotamia, a cylinder seal of an early period, and a bead of the Persian period (c. 500 B.C.); from India, two seals and a bead from Mohenjo-daro, and three seals and a large number of beads from Harappa.

These specimens have been specially examined with reference to their hardness, their external appearance, and their internal structure as shown by microscopic sections.

#### EGYPT.

True glazed steatite is an almost entirely Egyptian product. It appears in the Badarian period, and is earlier than glazed faience which does not appear until Predynastic times. The finest specimen in this period is the great Badarian



FIG. 2.—MATMAR, EGYPT: VI DYN.  
 $(\times 1\frac{1}{2})$

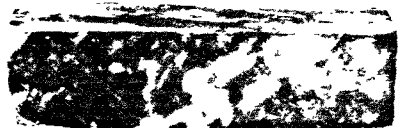


FIG. 3.—EGYPT: XII DYN.  
 $(\times 1\frac{1}{2})$



FIG. 4.  
DASHUR :  
XII DYN.



FIG. 5.  
HEMAMIEH :  
XVIII DYN.



FIG. 6.  
XVIII  
DYN.



FIG. 7.—QAU :  
XXIII DYN.

(All  $\times 1\frac{1}{2}$ )

girdle (Fig. 1) (British Museum, No. 62150). The process was continued during the Predynastic period, but was chiefly, if not entirely, used for small beads, either cylinder or bi-cone. During the early dynasties up to the XIIth, the process was used extensively for beads (Figs. 2, 3), amulets (Fig. 4), and scarabs. After that beads are rare, but it was still frequently used for amulets (Fig. 5) and scarabs (Fig. 6) up to the XVIIIth dynasty, and continued in use until the XXVIIth dynasty (Fig. 7).

There are a few very fine specimens of Egyptian glazed steatite of considerable size. These date, for the most part, from the XIIth to the XVIIIth dynasty. One of the largest of these specimens is a statue of Tauert, of the XIIth dynasty, at the British Museum (No. 11862) (Fig. 8A). It has a blue glaze. The way in which the glaze has run unevenly is very characteristic of large steatite



A.



B.

FIG. 8.

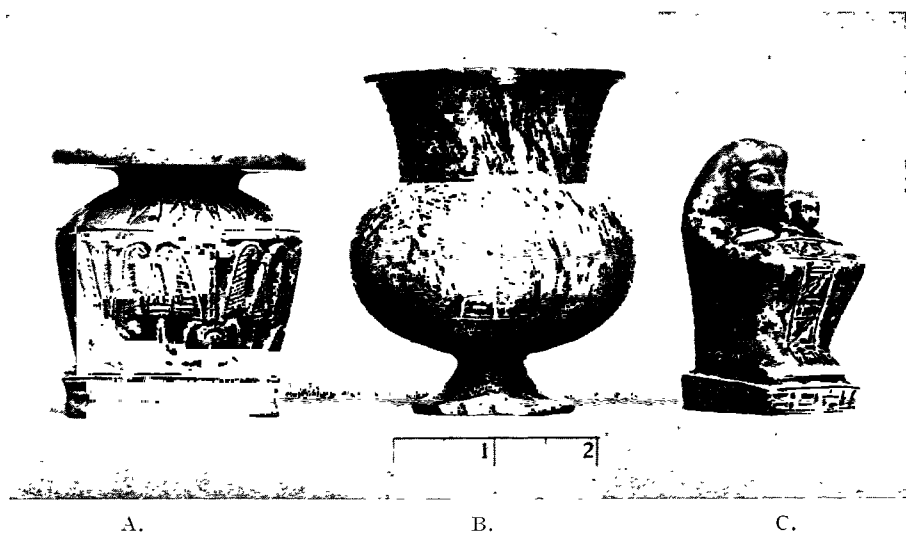


FIG. 9.

specimens. The figure is about  $6\frac{1}{2}$  inches high, and dates to c. 2000 B.C. Another example is a steatite vase (B.M. No. 4762) (Fig. 9B) which is unfortunately slightly broken. Great skill must have been employed to make the sides so thin; in some parts they are only .06 inch thick. The pattern of the stone shows in a very marked way through the glaze, which is green. This specimen has an inscription of Tuthmosis I (c. 1550 B.C.). A seated statuette of Thunera holding Price Teni on his knee (B.M. 35400) (Fig. 9C) is a very fine specimen. An inscription dates it to the time of Thutmosis III (c. 1501-1447 B.C.). The blotchiness of the green glaze is very marked.

The kohl-pot shown in Fig. 9A (B.M. 3723), which probably dates from the XVIIIth dynasty, is so carved that all the front decorated portion stands out with a hollow behind it. The base is a separate piece cemented on. The glaze is green.

Perhaps the finest specimen of all is the head and upper part of a statuette (B.M. 15078) dating from the end of the XVIIIth or beginning of the XIXth dynasty (14th to 13th century B.C.) (Fig. 8B). It represents a high officer of state dedicated to Amen Ra. The glaze is blue. I have not seen any of these rare specimens of a later date than the XIXth dynasty.

*Hardness.*—Of the Badarian beads tested, four out of five scratched glass easily and the other moderately well; of the Predynastic, one scratched it easily, one moderately well, one slightly, and two not at all. The Old Kingdom bead would not scratch glass, the First Intermediate and the XIIth dynasty beads scratched it easily. The unglazed specimens are altogether softer and can easily be scratched with a pin. The hardness of these is well under 2. Some of the Badarian beads showed great hardness. Specimens from the same girdle as those in Pl. I, 2, 3, were tested against quartz; they distinctly marked a natural quartz surface and were very difficult to scratch with a quartz pencil. This shows that their hardness is practically the same as that of quartz, *i.e.*, 7. Some of the Predynastic and Old Kingdom beads had a hardness of just about 6. As the hardness of the glass used for testing was practically 6, all these glazed beads had a hardness that was between  $5\frac{1}{2}$  and 7. Even the softest of them would be so hard that an ordinary knife would scratch it only with great difficulty. Later it will be shown that almost all the beads of burnt and painted steatite have a hardness which ranges from slightly above 3 to not much over 2.

*External Appearance.*—The external appearance of the glazed surface also varies a great deal in the different specimens. The colour can be blue or green over the whole surface, it can be mottled with white to a greater or lesser extent, or it can be completely white. The surface may be smooth with small pits or depressions in it, but with all the irregularities of the base, if any, hidden by the thickness of the glaze. This is generally the condition of the Badarian specimens, unless the glaze has completely flaked away. The Predynastic examples generally have a very rough base of steatite with coarse marks resembling file marks showing through the glaze. In the specimens I have examined these “file” marks are parallel to the axis.

In the beads of the First Intermediate period, the colouring has so completely disappeared that one almost doubts if they ever were coloured. In these the base has rough “file” marks at about  $30^{\circ}$  to the axis. The XIIth dynasty bead has a very thick vitreous glaze which almost formed drops and showed signs of flowing.

*Internal Structure.*—An examination of the sections by means of a microscope shows at once that there is considerable difference in the different specimens. But they all show that the addition of the chemical or glaze used for glazing, and the subsequent heating have completely altered the nature of the stone for some distance in from the surface. The original stones used to make the base are very different. In some cases they are pale, and in some cases dark; some have a very fine structure and some much coarser; and I am not sure that they are all steatite. But whatever glaze or chemical was used, it has had the invariable result of making the layer of affected stone harder, more opaque, and white. It has also greatly reduced the polarising effect of this layer. A possible exception to this is found in the painted steatite referred to under Indian specimens.

This chemically affected surface, whether produced by the glaze or the alkali only, has two curious features when examined as a section under a microscope. First, the white opaque portion is not usually a uniform layer, but has a series of alternating dark and light layers as one goes from the surface towards the base. These vary greatly in intensity in different specimens. The layer furthest from the surface is often the most intense.

Perhaps the clearest example of this is the Badarian bead shown in Pl. I, 1. Here, although all the glaze has broken away, five different layers can be seen before the unaffected portion of the base is reached. On the other hand, in the chemically affected cylinder seal from Ur (Pl. II, 5) the alternating layers are scarcely visible.

The second curious feature is that in most cases there is a thin layer on the surface which has only been affected very slightly, and in some cases perhaps not at all. This is shown in Pl. I, 2, 4, 6, and to a less marked degree in some others. This unaffected surface layer is much more universally and markedly shown in sections of the etched carnelians. In this case only alkali is used, but it acts on the silica in the carnelian. No satisfactory explanation of this unaffected layer has been found.

In the description of the specimens, the layer or layers of glaze are called A; if two layers are present, A.1 and A.2. The unaffected layer is called B; the first dark (opaque) layer is called C.1, and the later ones C.2, C.3, etc.; and the first lighter layer (other than B) is called D.1, and successive similar layers, D.2, etc. E is the unaltered base.



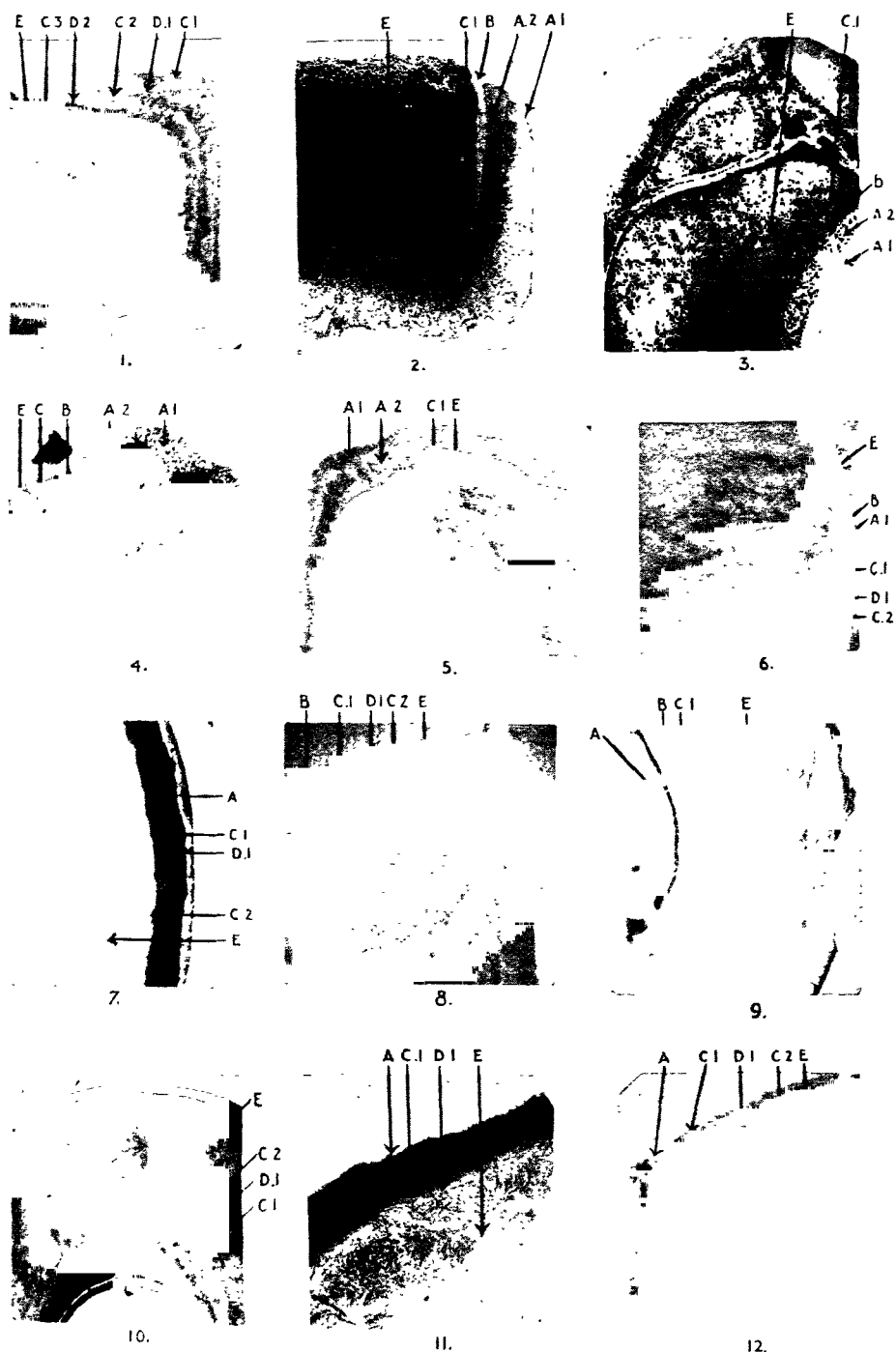


PLATE I.

*Glaze.*—The glaze shows several varieties. First, a glaze which has a large number of crystals which almost entirely fill it. Second, a glaze with a few crystals mixed in a clear glaze which is not isotropic. Third, a clear glaze which is isotropic; that is, pure glass.

It will be seen by reference to the summary of results that all the Badarian beads which have any glaze left belong to the first class, and that one of the Predynastic beads (Pl. I, 7) is the only other specimen which has this variety

of glaze. The remaining Predynastic specimens which have any glaze left are of the second variety, a glaze which is not isotropic as it polarises, and which also contains a few small crystals.

The XIIth dynasty bead is of the third kind, as it is a pure vitreous glaze which does not polarise. The bead of the Persian period from Ur is perhaps an intermediate type; the remains of the glaze are so slight that it is difficult to be certain, but what I take for a thin layer of glaze over a portion of the perforation seems to be a vitreous glaze but to have a few small crystals in it.

The beads with the best glaze are the Badarian, and of these the most typical are those from the Badarian girdle found in 1928 (B.M. 62150). Sections through beads from this girdle (Pl. I, 2-5) show an apparently wide band of blue glaze round a white core. Microscopic examination of this wide, blue band shows that it consists of two layers: the outer, which is about half the width of the whole, is composed entirely of blue crystals which polarise extensively; the inner layer consists of a very much more compact mass with many small crystals in it, many of which polarise. The junction between these two layers of glaze is fairly abrupt. The crystals in the glaze have been identified by Dr. Thomas of the Geological Survey as mullite, which is a silicate of alumina. This very distinct double layer of glaze I have only found in Badarian beads. It is difficult to explain how the crystals are formed, as there is no alumina in most steatite, and a maximum of between 5 and 10 per cent. in any known varieties. This, Dr. Thomas considers, would not be sufficient to make the very extensive crystals found in the Badarian beads. Two possible explanations are either that the stone used is not a steatite, or else that a felspathic glaze has been used, which would make a true porcelain and account for the great hardness. It is the mullite crystals which give the great strength to porcelain.

In this connection it is interesting to note that the Predynastic bead (Pl. I, 7) is the only Predynastic bead tested which has a large number of crystals in the glaze, and that it is the only one which will scratch glass easily, in this way showing the effect of the crystals on the hardness.

Whatever method had been used to produce the glaze or to harden the surface, it had a great effect on the steatite base. In some cases the latter seems to have altered through the complete thickness of the bead, and in others there seems to have been an actual dissolving away of the stone. See, for example, the rounding away of the chip in Pl. I, 3.

Of the five Badarian beads, one has no glaze remaining, and on the other four the glaze consists entirely of mullite crystals. Of the five Predynastic beads, one has no glaze remaining, one has large crystals in the glaze, and three have a few small crystals in a clear glaze which is not completely isotropic. From this it appears that the Badarian beads are better than the Predynastic as regards hardness, shape of the stone base, and quality of glaze. This may be due to the use of a different stone, or to some different process; but the Predynastic beads are so similar in some ways that I do not think it would be safe to attempt to date beads by this method. At the same time, it is rather striking that all the Badarian glaze examined should be so much more crystalline than the Predynastic.

In order to see if any of the alteration of the steatite was due to the time that elapsed since they were made, I selected two unglazed steatite beads, one Badarian and the other Predynastic, and cut sections (Pl. II, 3, 4). The microphotographs of these show that no alteration can be detected.

## MESOPOTAMIA.

Beads of glazed or burnt steatite are not common in Mesopotamia from early sites. At Ur almost the only specimens dating before the Persian period are the minute beads from the grave P.G. 55. This grave, which unfortunately had been plundered, was originally very rich and may have been a royal tomb. It was found in the old cemetery and is dated by Dr. Leonard Woolley to the fourth millenium B.C. These steatite beads were associated with a great number of carnelian and lapis-lazuli beads, not much larger, and are supposed to have formed a girdle. Some of the beads are extremely small, about .04 in. in diameter and .024 in. long. A number of beads of a very much rougher nature, also found at Ur, are dated to the Persian period.

Whilst digging in the great pit at Nineveh during the 1931-32 expedition, Mr. M. E. L. Mallowan and Dr. R. Campbell Thompson found a large number of small burnt steatite beads. The earliest was a single specimen at 63 feet below the datum line. This is in the period they call Ninevite II. In the next period, Ninevite III, in a child's burial 44 feet below the datum line, about 50 of these beads were found together with about 20 black beads which had not been burnt (Fig. 10). These were all small cylinder or barrel beads. At the same depth some larger beads of different shapes were also found (Fig. 11). In Ninevite IV some hundreds of these beads were found. In all cases the beads from Nineveh appear to have been made from a dark stone which had been whitened by treatment.

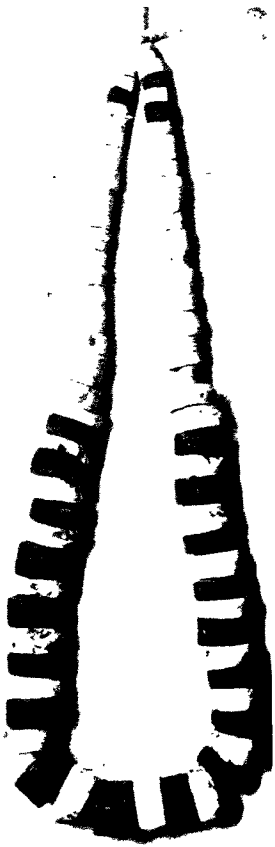


FIG. 10.—FROM  
NINEVEH. ( $\times 1\frac{1}{2}$ )



FIG. 11.—FROM NINEVEH.  
( $\times 1\frac{1}{2}$ )

By far the most important specimens of steatite found in Mesopotamia are a few seals found at Ur and Kish (C. J. Gadd, *Proceedings of the British Academy*, XVIII, 1-22). These have a style of design closely connected with designs on seals found in the Indus valley at Harappa and Mohenjo-daro and provisionally dated to 2750 B.C. There is strong evidence that these seals from Ur were not made there, or at Mohenjo-daro or Harappa, but that they came from some site at present unknown. All these seals are not glazed, but "burnt."

A seal similar to these, but of unknown provenance, is made of a dark steatite. It is supposed to have come from the same source as the Mesopotamian seals, as the shape and design are similar; the workmanship, however, is very inferior. The surface of the seal shows no sign of having been treated chemically; in some of the grooves, however, there are brown marks which may be the remains of chemical treatment.

A cylinder seal which had been "burnt" was found at Ur. It is not accurately dated, but from its design it evidently belongs to an early period.

*Hardness.*—The hardness of the beads and seals from Mesopotamia is very much less than that of the Egyptian beads. The early beads seem to be very slightly softer than those of the Persian period, but both are about 3.

*External Appearance.*—None of the Mesopotamian burnt steatite beads or seals has any trace of colour. Those from the early period are almost all carefully finished, but the later ones which date to the Persian period are extremely rough.

The technique of beads from Mesopotamia appears to be identical with that of beads from the Indus valley described later.

*Internal Structure.*—The photographs, Pl. II, 5 and 2, show the structure of an early cylinder seal and a bead of the Persian period, both from Ur. The former has very little of the affected portion remaining, whilst the latter is very similar to Indian specimens. The question of the structure of *burnt steatite* is discussed with the Indian beads.

## INDIA.

A careful examination of six seals and several hundred beads from Mohenjo-daro and Harappa convinces me that a different method was employed there from that used in Egypt. It also makes me think that more than one method was employed in the Indus valley.

*Hardness.*—The difference between the Indian and Egyptian beads is most clearly shown by their difference in hardness. The former, with one exception, have a hardness of 3, whilst the hardness of the latter is between  $5\frac{1}{2}$  and 7. The difference in hardness cannot be attributed to great age, though the hardest Egyptian beads are the Badarian, which are much earlier than those from the Indus valley.

The *painted steatite* beads, however, vary considerably in hardness. Most of them are under 3; the softest seems to be only a little above 2, but one small bead is a little over 5.

*External Appearance.*—A careful examination of the surface of the seals does not show any signs of a blue glaze having been applied, but some of them show a brown discoloration of part of the surface which suggests the colour on some of the "painted" beads. The surface seems in absolutely perfect condition and has no tendency to rub away. The workmanship of these seals far surpasses



FIG. 12.



FIG. 13.



FIG. 14.

FIG. 15. ( $\times 1\frac{1}{2}$ )

ALL FROM HARAPPA.

any work done on steatite elsewhere, and both for design and execution compares very favourably with the best Greek work. Figs. 12, 13 and 14 are three broken seals from Harappa. Over 500 seals have been found at Mohenjo-daro or Harappa, with some of their designs very similar to those on the seals (p. 77) from Ur; but they are more varied and their shape is different. The beads, however, vary greatly. A few, in most cases the more elaborate ones (Fig. 15), have a very similar surface to the seals, but the majority have a softer surface which tends to become powdery. Also, although most of the beads are now white, a few have quite large patches of blue or green material which appears to be a glaze, and a larger number have brown patches that seem to be the remains of a broken-down glaze. Neither the green nor the brown form of glaze is found on the beads which have a surface resembling the seals.

A flake of this glaze examined under a microscope (M.S. 987) has a fairly bright blue colour, is transparent without many impurities, is isotropic, is iridescent, and in every way appears to be a true vitreous glaze; but the bead from which it came has a hardness of considerably less than 3. I think that the majority of the beads from Harappa have had some glaze of this sort, and that it is the flaking away of this glaze that leaves the very powdery surface.

In a number of experiments I found that any form of vitreous glaze added to steatite raised the hardness to at least  $5\frac{1}{2}$ , whether the glaze had flaked off or not. Also that usually the greater the heat used, provided some alkali was present, the harder the stone became and the whiter the surface. I have not been able to find out how the beads with a pure white surface, remains of a vitreous glaze, and a hardness of only 3 were made.

Only two of the beads that I have examined came from Mohenjo-daro. They were much bluer than any steatite beads from Harappa, and had a different technique. The blue material is very difficult to diagnose. It shows no signs of being vitreous, but seems to be an aggregate of a great number of minute transparent particles which have a green appearance by transmitted light when

viewed under a high magnification. In the section (Pl. II, 8) it shows as an extremely narrow transparent patch at the bottom of the right-hand side. The surface is soft being under 3, and the colour is easily rubbed off.

One very attractive form of treated steatite, up to the present only found on sites of the Indus civilisation, is *painted steatite*. I have seen eleven beads with this technique from Harappa (Fig. 16). These apparently had the surface first whitened and then the pattern painted in red or brown. As the colour in many specimens goes over a great part of the surface leaving comparatively narrow white lines between, it looks at first sight as though the coloured portion was the background and that the pattern was painted on with white paint.

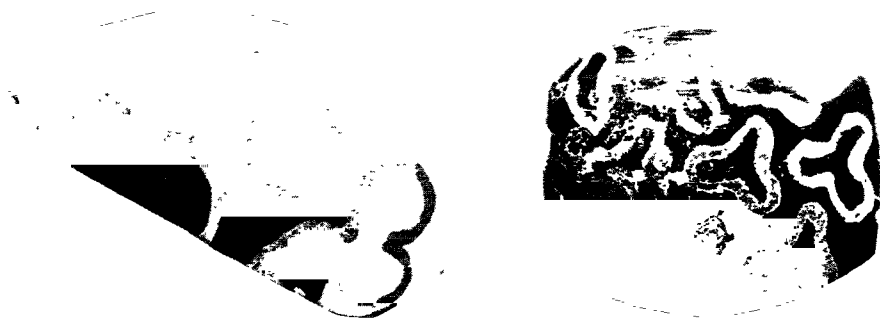


FIG. 16.—FROM HARAPPA. ( $\times 1\frac{1}{2}$ )

As already stated, all except one of the eleven “painted” beads examined were very soft, having a hardness of 3 or less. A section through one of these beads shows that the colouring matter is in a thin opaque layer on the surface. It differs from the ordinary opaque layers of glazed or burnt steatite by showing, when viewed with light from above, as a brilliant red material instead of a white one. The thickness of the layer in the specimen examined is .0003 in. The colour is probably caused by first painting the specimen with a ferruginous clay, or some other salt of iron, such as nitrate of iron, and then firing it. I made numerous experiments with these and other materials, but although I got effects very nearly (but not quite) the same in appearance, my specimens were always harder and the internal structure was different.

This makes me think that perhaps they were made without using excessive heat, but were baked at a moderate heat for a prolonged period. Another fact which makes me favour the last suggestion is that in some specimens the colour is not thoroughly fixed, so that a quantity of it can be dissolved in pyridine. I found that if I took a bead in which the colour was soluble and heated it to a bright red heat it made no apparent difference to the colour of the bead, but it made the colour much less soluble.

Whilst endeavouring to reproduce painted specimens, I found that in order to prevent the effect of the clay solution or nitrate of iron from spreading over the unpainted parts of the specimen, it was necessary to have some form of stopping-out. I found that if the white pattern was painted with vaseline it was quite successful.

In India, in addition to the early seals and beads, a glazed steatite bead representing an elephant has been found at Taxila. This has been dated to the 3rd century A.D. and is, I think, of Indian manufacture.

*Internal Structure.*—Over twenty sections of steatite seals and beads from the Indus civilisation have been examined. These all show that the original

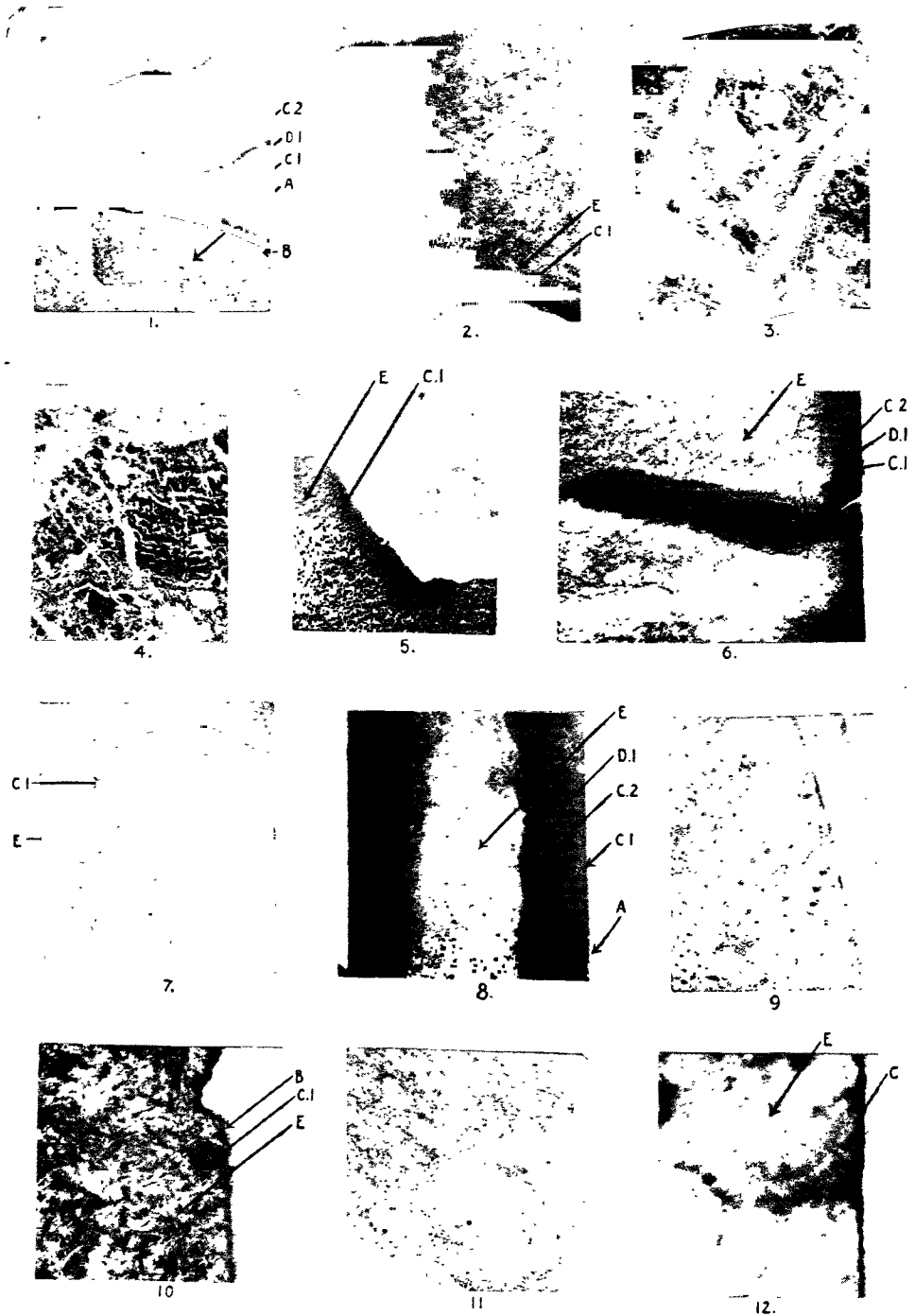


PLATE II.

stone extended to the surface of the specimen. The beads are sometimes referred to as being made of a steatite paste (Sir John Marshall, *Mohenjo-daro and the Indus Civilisation*, p. 515, footnote), and the seals as having been carved in steatite and then finished off with a paste (*Op. cit.*, p. 379). This opinion was formed because so many of the specimens had a layer of white on the surface which flaked away very easily. A microscopic examination of three typical seal fragments shows that in these instances the surface had not been added as a paste, but that the seals had been carved completely from a block of steatite,

and then treated with an alkali and heated. This is very well shown in Pl. II, 6, where the section shows a small crack in the steatite base, which reaches to the surface. The affected layer penetrates to a considerable distance from the surface, and to approximately the same distance on each side of the crack throughout its length. The crystalline structure of the steatite base is clearly visible continuing throughout all the affected area; this would not occur if the affected layer had been put on as a paste, nor could it in that case extend up the crack.

In the hope of finding out the exact treatment which these specimens had received, I tried a few experiments. I first cut a piece off a seal of early date from Nihavand. Part of this I made into a microscope section (Pl. II, 9), in which the surface showed no difference from the base. The other part I heated until it was red hot; a section from it (Pl. II, 10) shows very clearly a thin clear layer on the surface (B) and an opaque band below (C.1). The effects of polarising and illuminating from above were the same as in the Indian seals. The stone that this bead was made of may be a chlorite and not a steatite.

In order to carry out some experiments on a better basis, I got some very clear, white steatite and cut a section from it (Pl. II, 11). I then treated a portion of the same steatite with soda, heated it, cut a section, and obtained the result shown in Pl. II, 12. In this case, the effect does not go so far into the surface, but the narrow band (C) is extremely opaque. Another piece of the same stone was treated with salt and heated. This gave a rather deeper layer, and a slight tendency to light and dark layers. All the pieces of steatite and chlorite treated with alkali and heat only developed a hardness of approximately 3.

I then tried to add a glaze, using a piece of steatite, soda, and a bit of glass broken from a  $3 \times 1$  microscope slip. I could not get my glaze sufficiently hot to flow properly, but it did flow over a portion of the surface. This glaze was very brittle and full of bubbles, and most of it broke away whilst the section was being made. The result is shown in Pl. III, 2. The glaze is so transparent that it is scarcely visible, except on the lower part of the section. Below it is a curious lattice-like layer, and beneath that a wide opaque band. The hardness was approximately 6.

It has been said (Bauerman, *A Text Book of Descriptive Mineralogy*, p. 222, footnote) that a steatite paste made by mixing finely powdered steatite and water becomes, when heated, a very hard, compact material. Several experiments that I have tried failed completely to fuse it together, and the least touch reduced it to a powder. Dr. Thomas, of the Geological Survey, confirmed this, and said that under these conditions pure steatite would not fuse, but that if the steatite was very impure and contained a quantity of felspar it probably would fuse. I think it probable that Bauerman accidentally omitted to say that a flux was used.

It has been pointed out (Sir John Marshall, *op. cit.*, p. 576, footnote) that a steatite paste formed by mixing finely powdered steatite and silicate of soda can be fused. This can be done by heating either to a red heat for a short time or to the low temperature of  $100^{\circ}$  C. for a couple of hours. In both cases the material is considerably harder than the face of the Mohenjo-daro seals. An examination of a microscopic section shows that the structures are quite different.

In the same book it is stated that fragments of two steatite faience vases have been found at Mohenjo-daro. This is most important as nothing of the





	Period, Provenance and Reference.	Hardness.	Nature or Base.	Nature of Surface.	Colour.	Glaze	Remarks	A <sub>1</sub>	A <sub>2</sub>	B	C <sub>1</sub> D <sub>1</sub>	C <sub>2</sub> D <sub>2</sub>	C <sub>3</sub> L
Pl. I.	Fig. 1 Badarian. Badari B 1082.	6½	Well made.	Small pit holes; a few bubbles; no file marks.	Good; blue in parts.	None.	Glaze all broken away.	-	-	-	-	-	-
	Fig. 2 Badarian. Badari 28/592.	7	Do.	Do.	Good blue.	Ar pol. Large mullite cryst. A2 do. Small mullite cryst.	Base affected throughout	"	"	"	"	"	"
	Fig. 3 Badarian. Badari 28/592.	7	Do.	Do.	Do.	Ar pol. Clear blue cryst. A2 do. Slightly blue cryst.	Does not pol. in ch Cryst. in glaze not so clear as last.	*	"	"	"	"	"
	Fig. 4 Badarian. Mostagedda 30/2509.	6	Do.	Do.	Mottled white.	Ar pol. Large dark cryst. A2 do. Small pale cryst.	Not so well glazed as last.	"	"	"	"	"	"
	Fig. 5 Badarian. Badari 28/1221.	6	Do.	Small pit holes.	Brown spots; white and blue patches.	Ar pol. Big blue cryst. A2 do. Clear with crist.	Dark stannic base, large structural pores in thick.	"	"	"	"	"	"
	Fig. 6 Pre. S.D. 31. Nagada 1587.	5½	Very rough.	Rings round and lines parallel to axis.	Blue; white patches.	Pol. With a few small cryst.	Little glaz left - affected layer very thin	-	-	-	-	-	-
	Fig. 7 Pre. S.D. 31. Nagada 1871.	6	Do.	Cracks; ridges and pits; file marks parallel.	Do.	Pol. With large cryst.	About .002 in. thick.	"	"	"	"	"	"
	Fig. 8 Pre. S.D. 38-48. Badari 3740.	6	Do.	Vitreous.	Blue.	None.	Is very weak looks bl. glaze lost stannic structure.	"	"	"	"	"	"
	Fig. 9 Middle Pre. Matmar 31 3061.	5½	Well made.	Few large spots; much like No. 1.	Mottled blue and white	Pol. With a few small cryst.	Ext. mal appearance like Pata-	"	"	"	"	"	"
	Fig. 10 Middle Pre. Matmar 31 5112.	6	Fair.	Crackle.	Blue, with yellow and small white spots.	Only traces remaining.	Glaze shows signs of dissolving the stannic base.	"	"	"	"	"	"
	Fig. 11 Old Kingdom. Hamemia M.S. 133.	5½	Well made.	File marks parallel to axis.	White.	None.	"	"	"	"	"	"	"
	Fig. 12 Vth Dynasty. Qau 23 1081.	6	Fair.	File marks 30 deg. to axis.	Do.	Traces with clear surface.	Different layers are not very clear	"	"	"	"	"	"
Pl. II.	Fig. 1 XIth Dynasty. Egypt B'333.	6	Affected throughout.	Vitreous; highly polished.	Blue.	Vitreous; flows into lumps and bubbles; thick does not pol	Thickness about 1 part of glaz broken away	"	"	"	"	"	"
	Fig. 2 Mesopot c. 500 B.C. Ur u 13674.	3	Very rough saw cuts.	Bright brown.	Very white.	Little remains vitreous?	Base pol grey - suggests No 17 between Indus and Egypt	"	"	"	"	"	"
	Fig. 3 Unglazed Badarian. Badari 28 547.	1½	—	—	—	None.	No trace of corrosion	"	"	"	"	"	"
	Fig. 4 Unglazed Pre. Mostagedda 29/1847.	1½	—	—	—	None.	Do do	"	"	"	"	"	"
	Fig. 5 Cylinder seal. Ur B.2240.	3	Stratified.	File marks.	Very white.	" Burnt " surface - little left	Bas. H under 2	"	"	"	"	"	"
	Fig. 6 Indus seal. Mohenjo-daro E 1262.	3	Pale yellow.	Crackle which flakes off.	Do.	" Burnt " surface	Bas. H under 2, traces of it pale yellow.	"	"	"	"	"	"
	Fig. 7 Indus seal. Mohenjo-daro A.	3	Brown.	Numerous scratches.	Brownish white.	" Burnt " surface.	Bas. H under 2 C 2 is excessively dark	"	"	"	"	"	"
	Fig. 8 Indus bead. Mohenjo-daro C 2138.	3	Affected throughout.	Do.	Blue and white.	" Burnt " surface - blue point	"	"	"	"	"	"	"
	Fig. 9 Persian seal. Nihavand.	1½	Black.	Black.	Black.	None.	—	"	"	"	"	"	"
	Fig. 10 Do. treated with soda. modern.	3	Black.	Black.	Do.	" Burnt " surfce	—	"	"	"	"	"	"
	Fig. 11 White steatite, modern.	1½	White.	—	White.	None.	—	"	"	"	"	"	"
	Fig. 12 Do. treated with soda.	3	Do.	—	Do.	" Burnt " surface	—	"	"	"	"	"	"
Pl. III.	Fig. 1 Do. treated with salt.	3	Do.	—	Do.	" Burnt " surface.	—	"	"	"	"	"	"
	Fig. 2 Do. treated with soda and glass.	6	Do.	—	Do.	Vitreous glaze	Little left of blue stain from Harappa.	"	"	"	"	"	"
	Fig. 3 Do. treated with soda and blue glass.	6	Do.	—	Do.	Vitreous glaze	—	"	"	"	"	"	"
	Fig. 4 } Indus bead.	3	Well made.	Good.	Do.	None.	—	"	"	"	"	"	"
	Fig. 5 } Harappa 117.	3	Do.	Do.	Do.	None.	—	"	"	"	"	"	"
	Fig. 6 Indus bead. Harappa 9 fr 2305.	3	Yellow.	Very smooth.	Do.	None.	Affected part did not give off alkali - shows C <sub>1</sub> , D <sub>1</sub> & C <sub>2</sub> .	"	"	"	"	"	"
	Fig. 7 Indus painted bead. Harappa 27 fr.	2½	Well made.	Very good.	Red and white.	None.	Opaque band shows red by reflection light	"	"	"	"	"	"



burnt specimens which have traces of glaze remaining, whilst some of the painted specimens, which are the softest, still have a hardness of over 2.

The illustrations in Plates I and II and most of those in Pl. III are microphotographs of sections of the beads already referred to. Although all the figures with the exception of Pl. III, 5, were photographed with ordinary illumination by transmitted light, each specimen has also been examined by polarised light, and by light reflected on to it from above.

The section shown in Pl. III, 4, is from a typical Harappa bead, and No. 5 shows the normal effect of light reflected by the ring illuminator. In this it is seen that all layers that look dark when seen with transmitted light become white when viewed by reflected light. The darker they are by transmitted light, the whiter they are when viewed with light reflected from above. This shows that the opacity is caused by numerous particles of white opaque material.

The only specimen in which the dark band does not appear white when viewed with light from above is the painted steatite bead in Pl. III, 7. In this case the opaque band appears brilliant red when viewed by reflected light.

Any variations from the normal effect are mentioned on the attached chart.

The specimens were examined with a 16 mm. apochromatic objective and a  $\times 6$  compensating eye-piece. The illumination was obtained in the following ways: that called ordinary illumination, by the use of a low voltage electric lamp as a source of light, and in the sub-stage an achromatic condenser slightly out of focus; for the polarised light the same arrangement was used, but, in addition, a nicol-prism was placed below the condenser and a tourmaline above the eye-piece, the nicol and tourmaline being crossed so as to give a dark field; for reflected light the Beck ring illuminator was used, combined with the Bracey colour corrector to correct the colour aberration of the illuminator.

The blue colour of the blue glaze of the Egyptian beads referred to in many cases became a green.

In conclusion, I am greatly indebted to Mr. Guy Brunton, O.B.E., who very kindly procured for me many of the Egyptian specimens; to Dr. Ernest Mackay for the fragments from Mohenjo-daro; to Dr. Leonard Woolley for specimens from Ur; to the British Museum, for permission to publish various specimens; to Dr. H. H. Thomas, of the Geological Survey, for his assistance in recognising different minerals; and to the Indian Archaeological Survey for sending beads for me to examine.

HORACE C. BECK.

## ARTIFICIAL EYES IN ANCIENT EGYPT.

SCATTERED throughout the literature of Egyptology there are numerous references to the materials composing the inlaid eyes of coffins, mummies, mummy masks, statues and statuettes.<sup>1</sup> As the writer has had opportunities from time to time of examining a large number of these eyes, it has seemed of interest to compare the observations made with those of others.

Before describing the ancient imitation eyes, the visible parts of the human eye may be mentioned. These are (*a*) the *white* of the eye, which is that part of the outer or sclerotic coat of the eyeball that is usually seen; (*b*) the *cornea* which is the circular, transparent, colourless front of the eye, through which the light enters and which is continuous with the sclerotic coat, but projects a little beyond it since it has a slightly greater convexity than the rest of the eyeball; (*c*) the *iris*, or coloured annular curtain behind the cornea, which expands and contracts and so causes the pupil to dilate or narrow, as the case may be; and (*d*) the *pupil*, which is the circular opening in the middle of the iris that appears to be black because beyond it is the dark interior of the eye.

Simple inlaid eyes consisting usually of small white shell beads date from Predynastic times,<sup>2 3</sup> but the earliest inlaid eyes of the kind under consideration known to the writer are of the IVth dynasty, though the IIIrd dynasty limestone statue of Zoser in the Cairo Museum almost certainly originally had inlaid eyes which have been gouged out.

The eyes examined will be described in chronological order, but it should be mentioned that in a few instances a partial examination is all that has been possible, sometimes because naturally the eyes could not be removed from their sockets for a complete examination, sometimes because the light in the museum was poor and it was impossible to obtain a clear view of the details, even with the aid of an electric torch, and occasionally because it was inconvenient at the time for a particular large museum case to be opened.<sup>4</sup>

## OLD KINGDOM.

The Old Kingdom inlaid eyes are of two entirely different kinds, which will be distinguished as Class I and Class II respectively.

*Class I.*

These eyes are admirable imitations of the natural eye and no better ones were made at any period.

*Eyelids*: a narrow copper rim surrounding the eyeball.

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<sup>1</sup> So far as is known artificial eyes were not used by the living.

<sup>2</sup> W. M. Flinders Petrie, *Prehistoric Egypt*, pp. 6, 7.

<sup>3</sup> Early objects in the Cairo Museum having inlaid eyes: No. J.52839, human figure with eyes inlaid in black material; No. J.57562, fish palette with one white inlaid eye probably not a bead; Guide No. 6201, ivory human figure with eyes of inlaid white ring beads.

<sup>4</sup> I have to thank the Curator and Assistant Curators of the Cairo Museum for much help.

*Eyeball*: (a) polished opaque white quartz, or (b) polished crystalline limestone. Sometimes the limestone is banded in the manner of alabaster (calcite), in which case it undoubtedly is alabaster; but sometimes it is without any special distinguishing features, when it may be either alabaster or marble, though generally alabaster. Since, however, both these materials are crystalline limestone, this name may correctly be applied to either and it is particularly appropriate when there is any doubt which of the two it is.

*Cornea*: transparent quartz (rock crystal), polished at the front, but matt (i.e., like "ground" glass) at the back and edges.

*Iris*: there is no separate iris, but the effect of an iris is produced either simply by the matt surface of the back of the cornea or sometimes by the material immediately behind the cornea, as dimly seen through the matt surface. Whether this material (when present) is dark brown resin, as in the case of many of the Middle Kingdom eyes, could not be determined without damaging the object.

*Pupil*: a small circular recess drilled in the middle of the back of the cornea and filled with a plug of very dark brown or black material.

*Examples*: (1) the eyes of a painted limestone statue of a squatting scribe (IVth dynasty); (2) the eyes of the statue of Rahotpe and Nofret (IVth dynasty); (3) the eyes of the "Sheikh el-Beled" (Vth dynasty); and (4) the eyes of a wooden bust of a man (Vth dynasty).<sup>1</sup> All these examples are in the Cairo Museum and have been examined as closely as was possible.

*Scribe*. Maspero states<sup>2</sup> that "the eyes are inlaid, the alabaster and crystal composing them are set in copper lids; a small splinter of ebony behind the crystal imitates the pupil. . . ." The eyeballs, however, are not alabaster, as stated, but opaque white quartz; and no evidence is given to prove that the pupils are ebony and it seems probable that they may be some other material, such, for instance, as the dark brown resin that was employed for the pupil of similar eyes in the Middle Kingdom.<sup>3</sup> Naturally the cornea could not be removed for the examination of the pupil, but the recess at the back and the dark brown or black filling can clearly be seen. That the pupil in such eyes was ever the head of a copper nail, as is sometimes stated, is most improbable and no evidence for this can be found. The copper rim is now covered with a green coating consisting of the products of the corrosion of the metal, which is very disfiguring. The iris cannot be seen clearly.

*Rahotpe and Nofret*. The eyeballs are opaque white quartz; the cornea is rock crystal; the iris cannot be seen very clearly, but appears to be partly brown and partly grey.<sup>4</sup>

"*Sheikh el-Beled*." Maspero states<sup>5</sup> that "The eyes were inlaid. . . . They are made of a piece of opaque white quartz, with a frame of bronze surrounding it to imitate the lid; a small disc of transparent rock-crystal forms the iris, while a tiny spangle of polished ebony<sup>6</sup>—not silver as has been said too often—fixed

<sup>1</sup> No. C.G. 32.

<sup>2</sup> G. Maspero, *Guide to the Cairo Museum, Trans.*, J. E. and A. A. Quibell, 1910, p. 54.

<sup>3</sup> See later.

<sup>4</sup> See No. 52945 (Middle Kingdom).

<sup>5</sup> G. Maspero, *Op. cit.*, p. 52.

<sup>6</sup> See previous remarks about the ebony.

behind the crystal imparts to it a lifelike sparkle." The rock crystal, however forms the cornea and not the iris, and that the frame should be bronze at that early date is most improbable, copper being much more likely. Baedeker rightly says <sup>1</sup> that the "eyes consist of pieces of opaque white quartz with copper frames to imitate lids," but is wrong when he states <sup>1</sup> that "small discs of rock-crystal form the pupil," the rock crystal, as already mentioned, being the cornea. Petrie refers to the "eyeball of stone and crystal in a copper frame." <sup>2</sup> The iris cannot be seen clearly.

*Wooden Bust.* The rims are copper; the eyeballs are crystalline limestone; the cornea is transparent rock crystal; and the iris, which is grey, is merely an optical effect principally produced by the matt surface of the back of the cornea <sup>3</sup>: no pupil can be seen.

## *Class II.*

These eyes are neither so elaborate nor so effective as those of Class I.

*Eyelids*: a narrow copper rim surrounding the eyeball.

*Eyeball*: polished crystalline limestone.

*Cornea*: none.

*Iris*: none.

*Pupil*: a large circular or oval piece of obsidian, curved and polished on the outside and attached to the front of the eyeball. Although the nature of the material has not been proved by analysis, there is a considerable amount of circumstantial evidence that it is obsidian. Thus, it has all the appearance of obsidian, which was well known in Egypt and had been employed for various purposes from predynastic times, and the only alternative would be black glass, the use of which in the Old Kingdom would be most improbable. Further, in those of the pupils that it has been possible to examine closely, the numerous small air bubbles that are such a constant feature of Egyptian glass are absent, as are also all signs of the surface corrosion that is so frequently found in ancient Egyptian glass and that occurs in some of the glass eyes of Roman date; the surface also shows fine lines caused by the abrasive powder used for grinding and polishing, whereas similar pupils of glass are generally, if not always, moulded.

*Examples*: (1) the eyes of the large copper statue of Pepi I and of the accompanying small statue (VIth dynasty); and (2) two loose eyes from a coffin found at Zawyet el-Amwât (Old Kingdom). These are in the Cairo Museum and have been examined so far as was possible.

*Pepi Statues.* Wainwright states <sup>4</sup> that "The use of obsidian as an inlay representing the pupil and iris of the human eye began with the Pepi statues of the VIth dynasty"; Quibell and Green state <sup>5</sup> that "The pupil, a disc of black stone, probably obsidian, is set in an eyeball of white limestone"; and Petrie refers to the "white limestone eye of the statue," <sup>6</sup> though which of the two statues is meant is not clear. The nature of the eyeballs was not determined. The rims are copper.

<sup>1</sup> K. Baedeker, *Egypt and the Sudan*, 1929, p. 90.

<sup>2</sup> W. M. Flinders Petrie, *The Arts and Crafts of Ancient Egypt*, p. 33.

<sup>3</sup> See No. 52945 (Middle Kingdom).

<sup>4</sup> G. A. Wainwright, *Obsidian in Ancient Egypt*, 1927, p. 89.

<sup>5</sup> J. E. Quibell and F. W. Green, *Hierakonpolis*, II, p. 46.

<sup>6</sup> W. M. Flinders Petrie, "The Portraits" in *Ancient Egypt*, 1915, p. 48.

*Coffin Eyes from Zawyet el-Amwât.* The eyeballs consist of hard, white crystalline limestone; the pupils are obsidian and the fragmentary rims are copper.

*Birds' Eyes.* In connection with the obsidian pupils of the Old Kingdom imitation human eyes, it may be mentioned that imitation birds' eyes of this period are also of obsidian. Thus the eyes of the gold head of the hawk found at the same place and probably of the same date as the Pepi statues "are formed by a single rod of obsidian polished in a spherical curve at each end. . . ." <sup>1 2</sup>: there are no rims. Wainwright refers to the use of obsidian for the eyes of a very large bird statue of the same place and date now in the Museum of University College, London.<sup>3</sup>

### MIDDLE KINGDOM.

The same two kinds of eyes that were made in the Old Kingdom continued to be employed also in the Middle Kingdom, though the pupils of those of Class II were sometimes resin in place of obsidian.

*Examples: Class I:* (1) six loose eyes from Dahshûr; (2) seven loose eyes from Lisht <sup>4</sup>; (3) two loose eyes of which the origin is unknown; (4) the eyes from the wooden mummy mask of Auabra; (5) the eyes of the statue and statuette of King Hôr; and (6) the eyes from the coffin of Sepa from El-Barsha.

*Class II:* (1) the eyes from both the inner and outer coffin of Amenemhet, prince of Hermopolis; (2) nine loose eyes mostly from El-Barsha; (3) the eyes from the coffin of King Hôr; (4) eleven loose eyes from Lisht <sup>5</sup>; and (5) the eyes from the coffins of Senebtisi. All these eyes except the last mentioned have been examined, many of them being in the Cairo Museum.

### CLASS I.

*Loose Eyes from Dahshur.* These six eyes (three pairs) are all alike; the rims are silver; the eyeballs are opaque white quartz; the cornea is transparent rock crystal; at the middle of the under side of the cornea a small circular recess has been drilled to receive the pupil, the nature of which and of the iris will now be dealt with. Vernier, who has described these eyes,<sup>6</sup> wrongly identifies the opaque quartz eyeball (*pierre blanche* he calls the material) as the cornea.

In one of the eyes (No. 52948) the cornea is missing and in another (No. 52949) it is loose and can be removed. These two specimens, therefore, can be studied in much greater detail than the others.

No. 52948. The cavity in the eyeball is very deep, much more so than usual, and is partly filled with dark brown resin. Vernier points out that this

<sup>1</sup> W. M. Flinders Petrie and J. E. Quibell, *Hierakonpolis*, I, p. 11.

<sup>2</sup> The writer had the good fortune to be allowed to examine this rod on one occasion when it was removed temporarily from the head.

<sup>3</sup> G. A. Wainwright, *op. cit.*, p. 88.

<sup>4</sup> Six of these eyes were kindly given to the writer by Mr Ambrose Lansing of the Metropolitan Museum of Art, New York.

<sup>5</sup> These were kindly given to the writer by Mr. Ambrose Lansing.

<sup>6</sup> E. Vernier, "Bijoux et Orfèvreries," in *Cat. Gén. du Musée du Caire*, I, Nos. 52945, 52946, 52947, 52948, 52949, 52950, pp. 312-4.



filling is friable (*sans beaucoup de résistance*) and that it must have been introduced into the cavity in a viscous (*malléable*) condition. In the absence of the cornea, the iris and pupil are also necessarily missing.

No. 52949. The sides and bottom of the cavity in the eyeball, which is not nearly so deep as that in No. 52948, are very irregular and show how the quartz has been drilled and chipped out, the mark of a circular drill being still visible. It seems almost certain that a filling of a similar dark brown resin to that present in No. 52948 originally existed in this case also (and probably exists, too, in the other four eyes, though it cannot be seen), having been put into the cavity to hide the uneven surface of the quartz and to help to form the iris; but the only evidence of this resin that now remains is a little in the hole in the cornea and a patch adhering to the back of the cornea round the mouth of the hole.<sup>1</sup>

No. 52945. The iris is partly grey and partly brown. When the cornea is merely placed on the resin filling and is not in absolute contact with it, but is separated from it by a thin film of air, the appearance, as seen from the front, is grey<sup>2</sup> and is due almost entirely to the optical effect of the matt surface of the back of the cornea; but when the resin is in absolute and intimate contact with the cornea, as in the case of the patch already described in No. 52949, and also in one of the Class I eyes from Lisht,<sup>3</sup> the colour, as seen from the front, is brown: whether the original intention was a grey iris or a brown iris is uncertain. The majority of present-day Egyptians have a brown iris and it seems probable, therefore, that this was also the case anciently, hence a brown iris would be more natural; but with a brown iris the black pupil would not be very apparent, whereas with a grey iris the black pupil is very distinct, and that the pupil should be clearly seen is necessary if the general appearance of the eye is to be satisfactory. If brown were the original colour, then the cornea must have been placed in position when the resin was still in a viscous condition before it cooled and became solid, since only in this manner could absolute contact between the cornea and the resin have been produced. If this were so, then the patches of brown that now exist on several of the eyes of this class are the remains of the original condition; and the grey may be explained on the assumption that the resin has shrunk so that it no longer makes absolute contact with the cornea. If, on the other hand, the original colour of the iris were grey, then the brown patches may be explained by assuming that in some manner (possibly by heat or pressure) portions of the surface of the resin have melted and have made absolute contact with the cornea. An original brown iris appears the more likely.

The pupil, which consists of a small cylindrical projection arising from the flat surface of the iris and filling the small recess at the back of the cornea, has a black top and apparently a white circumference. Vernier explains this by saying that the whole surface of the brown resin, except the top of the projection forming the pupil, was coated with a white material, that he states was undoubtedly plaster (*i.e.*, gypsum plaster), which he thinks had decomposed and partly disappeared. Gypsum plaster, however, is a very permanent material and does not decompose and disappear, and the few white particles now to be seen in some of the small cavities in the resin may be merely tiny particles of

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<sup>1</sup> See No. 52945.

<sup>2</sup> Like the iris of the eyes of the Old Kingdom wooden bust.

<sup>3</sup> See later.

limestone or plaster that have accidentally found their way in since the cornea was lost ; no such white material can be seen in any of the other eyes. The white, however, of the circumference of the projection forming the pupil is merely an optical effect due to the manner in which the light is reflected.

*No. 52946.* The iris is grey ; the pupil has a grey top and apparently a white circumference.

*Nos. 52947 and 52950.* In each case the iris is grey with patches of brown ; the pupils are black.

*Loose Eyes from Lisht.* These are two pairs and three single eyes, now described.

*Two Pairs of Eyes.* These are identical except in size, one pair being slightly smaller than the other. There are no rims. The wedge-shaped eyeballs are alabaster, in which a circular hole has been drilled with a tubular drill ; in this hole is a disc of dark brown resin, which from the manner in which it fits must have been put in while molten ; on the upper surface of this resin, a little to one side of the middle, a circular spot has been painted in black to represent the pupil ; on the top of the resin there is a disc of transparent rock crystal cemented in round the edges with resin ; this rock crystal is flat on the under side, the surface of which is matt, as are also the edges, but slightly convex on the upper side, which is polished ; there is no recess drilled at the back of the cornea ; as seen through the cornea the iris is grey with brown patches in one pair of eyes and entirely grey in the other pair, the brown in one eye where the cornea has been removed for examination being due to a little resin adhering firmly to the back of the cornea, and doubtless a similar state of things accounts for the brown patch in the other eye.<sup>1</sup>

*Single Eye.* This is practically identical with the eyes from Dahshûr except that the eyeball is not opaque quartz, but alabaster, which has been drilled out with a tubular drill, the marks of which still remain ; the cornea is transparent rock crystal, with a flat matt surface at the back and a slightly convex polished surface at the front ; at the middle of the back of the cornea a small circular recess has been drilled for the insertion of the pupil ; under the cornea which was removed for examination is a disc of dark brown resin, from the middle of the upper surface of which there is a small cylindrical projection that fits into the recess in the cornea and makes the pupil. There is no rim.

*Single Eye.* This is a tiny eye in a silver frame, manifestly from a statuette. The eyeball is crystalline limestone ; the cornea is transparent rock crystal ; the iris is grey and there is no pupil.

*Single Eye.*<sup>2</sup> This consists of a curved piece of transparent rock crystal of the " almond " shape of the conventional eye, with a small recess at the back for the pupil, which is now empty. There is no rim.

*Pair of Loose Eyes of Unknown Origin.*<sup>3</sup> These, which are of comparatively large size, are probably from a coffin. There are no rims ; the eyeballs are crystalline limestone ; the cornea is transparent rock crystal, between which and the bottom of the cavity in the eyeball there is a considerable space, now

<sup>1</sup> See No 52945.

<sup>2</sup> No. J.60261.

<sup>3</sup> Nos.  $\frac{21}{25} + \frac{11}{2}$  A. and B.

empty but manifestly at one time containing some filling, the only evidence of the nature of which is a small amount of brown powder (not resin) that on analysis was found to contain organic matter; but what this material has been and whether it was the filling or an adhesive could not be determined. In the middle of the under side of the cornea a small recess had been drilled for the pupil, which is now missing. The museum register describes these eyes as of limestone and quartz.

*Mask of Auabra.* The rims are metal, probably copper; the eyeballs are crystalline limestone; the cornea is transparent rock crystal; what the colour of the iris was originally is not certain, but now there are dark patches on it, which Lacau calls black and suggests<sup>1</sup> are the remains of the adhesive that fastened the cornea in place, though this would mean a black iris, which seems improbable; there is no evidence of pupils. Lacau calls the eyeballs alabaster.<sup>1</sup>

*Hôr's Statue.* The rims of the eyes are metal, stated by de Morgan to be silver<sup>2</sup>; the eyeballs are either opaque quartz or crystalline limestone, though which of the two was not determined; the cornea is transparent rock crystal; and the pupil cannot clearly be seen in the poor light of the museum gallery. The finder (de Morgan) states that the eyes are made of quartz,<sup>2</sup> which may refer either to the eyeball or to the cornea or both. One plate in de Morgan's report<sup>3</sup> shows the statue with certainly the right eye missing and possibly also the left, while another plate<sup>4</sup> shows both eyes. At the present time there are two eyes, but the right eyeball is somewhat whiter than the left, though whether this indicates a recent addition cannot be ascertained; this right eye, however, seems almost too good a match to be modern.

*Hôr's Statuette.* The rims are copper; the eyeballs are crystalline limestone and the cornea transparent rock crystal; there are no pupils.

*Coffin of Sêpa.* The eyeballs are crystalline limestone; the cornea is rock crystal with a small recess at the back filled with black material to represent the pupil; the iris is brown. Lacau calls the eyeball white alabaster, the cornea rock crystal, the pupil black and the iris brown.<sup>5</sup>

## CLASS II.

*Amenemhet Coffins.* One of the eyes from the inner coffin is still in place, but the other is exhibited separately.<sup>6</sup> The one rim remaining is copper; the eyeballs are crystalline limestone and the pupils obsidian. The eyeball of the loose eye is described in the museum register as alabaster, and the pupil as basalt. Lacau states<sup>7</sup> that the rims are metal, the eyeballs alabaster and the iris and pupil polished black stone.

The two eyes from the outer coffin are not in position, but are exhibited

<sup>1</sup> P. Lacau, "Sarcophages antérieurs au nouvel empire, II," in *Cat. Gén. du Musée du Caire*, No. 28107, p. 85.

<sup>2</sup> J. de Morgan, *Fouilles à Dahchour, mars-juin, 1894*, p. 95.

<sup>3</sup> J. de Morgan, *op. cit.*, Pl. XXXIII.

<sup>4</sup> J. de Morgan, *op. cit.*, Pl. XXXV.

<sup>5</sup> P. Lacau, *op. cit.*, I, No. 28084, p. 199.

<sup>6</sup> No.  $\frac{21}{25} + \frac{11}{7}$ .

<sup>7</sup> P. Lacau, *op. cit.*, II, No. 28091, p. 63.

separately.<sup>1</sup> The eyeballs are crystalline limestone ; the pupils consist of plano-convex discs of limestone covered on both sides with a layer of black resin ; there are no rims. In the museum register these eyes are described as made of alabaster and bitumen. Although the black material of the pupils somewhat resembles bitumen in appearance, that it is not bitumen is proved by the fact (among other properties) that it is insoluble in petroleum spirit, whereas bitumen is soluble in this solvent. Lacau states<sup>2</sup> that the technique of the eyes from the outer coffin is identical with that of the eyes from the inner coffin, which, however, is not so.

*Loose Eyes mostly from El-Barsha.*<sup>3</sup> *A Pair of Eyes*<sup>4</sup>: no rims ; the eyeballs are crystalline limestone ; the pupil (one is missing) is obsidian. These are described in the museum register as of limestone and basalt.

*Pair of Eyes*<sup>5</sup>: no rims ; the eyeballs are crystalline limestone ; the pupils are obsidian. The museum register describes the materials as very fine polished limestone and obsidian.

*Pair of Eyes*<sup>6</sup>: the rims are metal, probably copper, much corroded ; the eyeballs are crystalline limestone ; the pupil (one is missing) is obsidian and probably does not belong. The museum register describes the materials as copper, limestone and basalt, respectively.

*Single Eye*<sup>7</sup>: the rim is metal, probably copper ; the eyeball is crystalline limestone ; the pupil is obsidian. The museum register describes the materials as copper, limestone and basalt, respectively, and states that the pupil does not belong.

*Single Eye*<sup>8</sup>: no rim ; the eyeball is crystalline limestone that has been accidentally stained green by a copper compound, probably from a copper rim that is now missing ; the pupil is obsidian. The museum register describes the eyeball as ivory, coloured green (*ivoire verdi*). Budge states<sup>9</sup> that " In the case of women of quality eyes made of obsidian and ivory were inserted in the eye-sockets," and he also mentions<sup>10</sup> " ivory eyes for inlaying in coffins," but no confirmation of this use of ivory can be found.

*Single Eye*<sup>11</sup>: the rim is corroded metal, probably copper ; the eyeball is banded alabaster ; and the pupil is black resin. The museum register describes

<sup>1</sup> No. J.34310.

<sup>2</sup> P. Lacau, *op. cit.*, II, No. 28092, p. 51.

<sup>3</sup> See Ahmed Kamal, " Fouilles à Dêr-el-Barsheh," in *Annales du Service*, II (1901), pp. 17, 32, 212, 217.

<sup>4</sup> Nos.  $\frac{21}{25} + \frac{11}{3}$  and  $\frac{21}{25} + \frac{11}{4}$ .

<sup>5</sup> No.  $\frac{21}{25} + \frac{11}{5}$ .

<sup>6</sup> No.  $\frac{21}{25} + \frac{11}{8}$ .

<sup>7</sup> No.  $\frac{21}{25} + \frac{11}{6}$ .

<sup>8</sup> No. J.34317.

<sup>9</sup> E. A. Wallis Budge, *British Museum Guide to the First, Second and Third Egyptian Rooms*, 1924, p. 17.

<sup>10</sup> E. A. Wallis Budge, *op. cit.*, p. 154.

<sup>11</sup> No. J.49474.

the rim as bronze, the eyeball as alabaster, and the pupil as resin, and states that this eye is from Abusîr el-Malaq.

*Hôr's Coffin.* The rims of the eyes are metal, probably copper; the eyeballs are crystalline limestone; and the pupils are obsidian. Lacau states<sup>1</sup> that the eyeballs are alabaster, very white and polished, and the pupils a polished matt black stone, probably obsidian.

*Loose Eyes from Lisht.* These eyes are all practically alike in both materials and technique; they only differ in size. There are eleven altogether, four pairs and three single ones. One of the single eyes is larger than the rest and is probably from a coffin, and another single eye that is very small is almost certainly from a statuette. The eyeballs in every instance are crystalline limestone; the pupils are obsidian, underneath which in seven cases certainly, and probably in nine, there was originally and still is in several instances a black material composed of whiting and resin coloured with carbon, which had been put in to fill the cavity below the pupil. The two exceptions are the large coffin eye and the small statuette eye: the former shows no traces of this black material, the cavity for the insertion of the pupil being merely a hole through the eyeball without any bottom; the latter has not been taken to pieces for examination. The only rim is that of the small statuette eye, which is of copper.

*Coffins of Senebtisi.* Mace and Winlock, describing the eyes of the three coffins of Senebtisi (XIIth dynasty) state<sup>2</sup> that those of the outer coffin are of "stone"; that those of the middle coffin "were made up of almost flat sheets of stone, obsidian for the pupils, and opaque calcareous stone for the whites . . . The pieces were fastened together with a blackish gum and set in tray-like wooden frames . . . the edges of which represented the eyelids"; and that those of the anthropoid coffin had "polished obsidian pupils, whites of calcareous stone and silver frames of which the edges project to represent the eyelids."

#### NEW KINGDOM.

All the human eyes of this period examined belong to Class II.

*Examples:* (1) the eyes of the coffins of Yuya (XVIIIth dynasty); (2) the eyes of the coffins of Thuyu and of the mask of Thuyu (XVIIIth dynasty); (3) the eyes of the coffins and mask of Tut-ankhamûn (XVIIIth dynasty); (4) the eyes of the canopic coffins of Tut-ankhamûn; (5) the eyes of the two large statues of Tut-ankhamûn; (6) the eyes of the Anubis statue from the tomb of Tut-ankhamûn; (7) the eyes of numerous human, animal and bird figures from the tomb of Tut-ankhamûn; and (8) the eyes of the coffins of Queen Meryet-Amûn (XVIIIth dynasty). All the above-mentioned eyes are in the Cairo Museum and have been examined as closely as was possible.

*Coffins of Yuya.* There are three coffins, the eyes of all of which appear similar; namely, blue rims, white eyeballs and large black pupils. The rims are glass; the eyeballs of both the innermost coffin and the middle coffin alone have been examined, those of the former being opaque white quartz and those of the latter crystalline limestone; the pupils of both coffins are almost certainly obsidian and not black glass (the alternative), though this cannot be proved

<sup>1</sup> P. Lacau, *op. cit.*, II, No. 28100, p. 77.

<sup>2</sup> A. C. Mace and H. E. Winlock, *The Tomb of Senebtisi at Lisht*, pp. 23, 30, 40.

without damaging the eyes. Quibell states<sup>1</sup> that the rims are blue glass, the eyeballs marble, and the pupils black glass.

*Coffins and Mask of Thuyu.* There are two coffins, the eyes of both of which have been examined. The rims are blue glass; the eyeballs are crystalline limestone; and the pupils almost certainly obsidian. The eyes of the mask are similar to those of the coffins, the eyeballs being crystalline limestone, and the pupils almost certainly obsidian. Quibell says of all these eyes that the rims are blue glass, the eyeballs white marble, and the pupils black glass.<sup>2</sup> With reference to the mask he states<sup>2</sup> that "a curious point is that there is a green faience backing to the white of the eye, invisible outside, inside nearly filling the space inside the blue glass." This the writer has not been able to examine.

*Coffins and Mask of Tut-ankhamûn.* The appearance of the eyes in all three coffins and mask are the same; namely, blue rims, white eyeballs and large black pupils. The rims of the coffin-eyes are dark blue glass, but those of the eyes of the mask are lapis lazuli. When the innermost (gold) coffin was first seen the eyeballs of the eyes were so badly decomposed that they fell to pieces when the coffin was moved, probably having been acted upon by the volatile acids derived from the fatty matter forming part of the black anointing material that had been poured over the coffin, though not over the face. These eyeballs were probably of crystalline limestone and the pupils (which were unacted upon) are almost certainly obsidian. The eyeballs of the other two coffins and of the mask have not been tested, but they are also probably crystalline limestone and the pupils almost certainly obsidian. Carter states in one place<sup>3</sup> that the eyeballs of the outermost coffin are aragonite and in another place<sup>4</sup> that they are calcite and that the pupils are obsidian.

*Canopic Coffins of Tut-ankhamûn.* The rims round the eyes are blue glass; the eyeballs of the eyes of three of the coffins are probably crystalline limestone (in the fourth coffin the eyes are missing); and the pupils are almost certainly obsidian.

*Large Statues of Tut-ankhamûn.* The eyes consist of white eyeballs, which have not been tested, but which are probably crystalline limestone, and large black pupils which are almost certainly obsidian. The rims are gold.

*Anubis Statue from the Tomb of Tut-ankhamûn.* The rims are gold; the eyeballs which have not been tested are probably crystalline limestone; and the large black pupils are almost certainly obsidian. Carter states<sup>5</sup> that the eyes "are inlaid with gold, calcite and obsidian."

*Human, Animal and Bird Figures from the Tomb of Tut-ankhamûn.* The eyes of a number of these figures have been examined with the following results:

*Human Figures.* In the eyes of six human statuettes the eyeballs are crystalline limestone and the pupils almost certainly obsidian. In the other instances not examined, the technique is similar and probably the materials are also similar. Of some of these statuettes Carter states<sup>6</sup> that "their eyes

<sup>1</sup> J. E. Quibell, "Tomb of Yuua and Thuiu," in *Cat. Gén. du Musée du Caire*, Nos. 51002, 51003, 51004, 51006, 51007, 51009; pp. 4, 5, 10, 20, 23, 28.

<sup>2</sup> J. E. Quibell, *op. cit.*, p. 28.

<sup>3</sup> Howard Carter, *The Tomb of Tut-ankh-Amen*, II, p. 52.

<sup>4</sup> Howard Carter, *op. cit.*, II, p. 247.

<sup>5</sup> Howard Carter, *op. cit.*, III, p. 41.

<sup>6</sup> Howard Carter, *op. cit.*, III, p. 52.

are inlaid with obsidian, calcite, bronze and glass." The bronze has reference to the metal rims, which have not been tested and which may be copper, and the glass possibly to the black or blue glass of the eyebrows.

*Cow Head.* The rims of the eyes are black glass; the eyeballs are crystalline limestone; and the pupils are almost certainly obsidian. Carter refers<sup>1</sup> to the "inlaid eyes of lapis lazuli glass."

*Cobra.* The cornea of the eyes of a large gilt wooden figure of a cobra consists either of glass or rock crystal, but probably glass, underneath which the black pupil is painted, while the yellow iris is probably gold leaf.

*Lions' Heads on Throne.* The technique and the materials of the eyes are similar to those of the eyes of the cobra, except that a small amount of white eyeball is shown, that is probably painted.

*Birds' Eyes.* Those that have been examined are almost certainly obsidian and probably the others also.

*Coffins of Meryet-Amûn.* Winlock describes<sup>2</sup> the eyes on both the first and second coffins of Queen Meryet-Amûn as having eyeballs of alabaster and pupils of obsidian, which they appear to be.

#### LATE EGYPTIAN PERIOD.

All the human eyes of this period examined belong to Class II. According to Elliot Smith and Warren Dawson<sup>3</sup> the practice of inserting artificial eyes into the eye-sockets of mummies "was already coming into vogue in the XXth dynasty," and Elliot Smith gives a number of examples; thus he says of the mummy of Queen Notmît (XXIst dynasty):<sup>4</sup> "Artificial eyes, made of white and black stone, were inserted under the eyelids. This is the earliest instance of the use of stone eyes or of the attempt to represent the pupil in an artificial eye in a mummy, although in statues such objects had been in use more than fifteen centuries." Other examples of inlaid eyes given are those of Queen Mâkerî (XXIst dynasty) and of five other mummies of the period XXIst to XXIInd dynasty.<sup>5</sup>

Three eyes of the period XXIIIrd to XXVth dynasty from Abusîr el-Malaq have been examined,<sup>6</sup> but whether these are from a mummy, a statue or a coffin is not known. The eyeballs are banded alabaster (calcite); the one pupil remaining (two being missing) is dark brown resin fastened to the flattened front of the eyeball; the frames are metal, either copper or bronze.

#### GREEK AND ROMAN PERIODS.

All the eyes of these periods examined are of Class II type, glass, however, being generally used instead of the crystalline limestone and obsidian of the earlier Class II eyes.

The Graeco-Egyptian coffin masks in the Cairo Museum have been described

<sup>1</sup> Howard Carter, *op. cit.*, III, p. 46.

<sup>2</sup> H. E. Winlock, *The Tomb of Queen Meryet-Amûn at Thebes*, pp. 18, 20.

<sup>3</sup> G. Elliot Smith and W. R. Dawson, *Egyptian Mummies*, p. 113.

<sup>4</sup> G. Elliot Smith, "The Royal Mummies," in *Cat. Gén. du Musée du Caire*, p. 96.

<sup>5</sup> G. Elliot Smith, *op. cit.*, pp. 99, 103, 105, 108-9, III, 114.

<sup>6</sup> From the Cairo Museum; not numbered.

by Edgar, who says <sup>1</sup> of the eyes on the first century masks that they are "usually painted" and, if inlaid, they are made of "opaque material, stone or glass," and he adds <sup>1</sup>: "So far as I have had them examined and tested, they seem usually, if not always, of glass." He also says <sup>1</sup>: "But on the heads of the present class the eye is usually inlaid in a different way: a small convex sheet of transparent glass or mica is laid over a plaster ground on which the iris is painted in black." With respect to the mica, Edgar states <sup>1</sup> that "On some of the specimens which I have seen the material looked like mica, but in most cases it seems to be artificial glass, sometimes iridescent and sometimes full of small air-bubbles." The present writer, who has examined all these masks, cannot find any on which the material is mica. Describing other masks, Edgar states <sup>2</sup> that "the eyes are here inlaid in transparent glass. Judging from examples in the Cairo collection, it seems to have been in the second quarter of the II<sup>nd</sup> century that this technique came into use." The results of the writer's examination of these mummy masks may briefly be summed up as follows: in addition to the eyes that are entirely painted, there are many in which the iris is painted in black and the whole eye covered with a thin piece of curved transparent glass, which is now sometimes iridescent owing to surface decay; there are many others that are fully inlaid, the rim being generally glass, often blue, but occasionally black, the eyeball white opaque glass, and the iris black opaque glass.

Petrie writes <sup>3</sup> that "The eyes are . . . more usually inlaid, and with copper foil fringes for the eyelashes." Of the eyes of certain Ptolemaic mummies in box coffins he says <sup>3</sup>: "They were made by bending and cutting a piece of opaque white sheet glass to the form, inserting a disc of black glass for the iris, and surrounding it with a neatly curved border of blue glass, always polished on the upper surface. . . ." He points out that <sup>3</sup> "The gilt busts of more substantial form, about 50 A.D., required more solid work; and the eyes are then cut in white marble, tapering wedge-shaped behind, and with a hole drilled in the middle to receive an iris plug of black glass or obsidian. The finest portrait busts demanded higher work, and then the iris was of clear brown glass or stone, with a pupil of black glass inserted. . . ."

The writer has recently examined eight pairs of eyes and eight single eyes from Roman mummy masks found at Sûnûfar, in the Fayûm province.<sup>4</sup> Nineteen of these eyes (seven pairs and five single ones) are practically alike in essentials, though differing in some instances in such details as shape and size. The eyeballs are crystalline limestone, that were surrounded originally by copper rims, which in most cases are now fragmentary or missing, but which in one instance are cut on the outer edges to simulate eyelashes. In one case the material used to fasten the eyeball into the socket remained, and on analysis proved to be gypsum plaster. The eyeballs are all more or less wedge-shaped and measure from back to front from 1.5 to 2.3 centimetres, the deeper ones being true wedges tapering almost to a point behind, and the shallower ones having a flat surface at the

<sup>1</sup> C. C. Edgar, "Graeco-Egyptian Coffin Masks," in *Cat. Gén. du Musée du Caire*, p. vi

<sup>2</sup> C. C. Edgar, *op. cit.*, p. viii.

<sup>3</sup> W. M. Flinders Petrie, *Hawara, Biahmu and Arsinoe*, p. 17.

<sup>4</sup> Three pairs and two single eyes are now exhibited in the Cairo Museum, Nos. J.63027-63031. Kindly submitted by Mr. O. Guéraud.



back. In the middle of the front of the eyeball there is a circular depression in which are inlaid the iris and pupil,<sup>1</sup> the iris consisting of black glass in the shape of a ring having an outer diameter of from 10 to 15 millimetres, with a circular hole in the middle from 3 to 6 millimetres in diameter, which is filled with a small cone-shaped plug of black glass to form the pupil.<sup>2</sup> Between the pupil and iris there is generally, though not always, a very thin piece of copper foil, so thin that it hardly shows at the surface. The glass of both the iris and pupil in all cases shows evidence of decomposition, generally, however, only on the surface.<sup>3</sup>

One pair of these eyes consists of thin, slightly concavo-convex eye-shaped pieces of bone, having in the middle of the front, instead of the usual cavity, a flattened circular area to which the pupil (now missing) had been fastened.

One single eye consists of an outer framework of dark blue glass; a thin slightly curved piece of opaque white glass flattened somewhat in the middle of the convex side to represent the eyeball, and a thin piece of glass, now white and much decayed, but probably originally black, that fitted on to the flattened surface of the eyeball to represent the pupil.

In one case an iris of black glass with a plug of black glass for the pupil are all that remain of an eye, and in another instance only the cone-shaped pupil of black glass is left.

#### UNDATED BUT MOSTLY LATE.

Twenty-six loose eyes (six pairs and fourteen single eyes), many of which are in the Cairo Museum, have also been examined; all of them, unfortunately, are undated. They are as follows:

*Pair of Coffin Eyes.*<sup>4</sup> The eyeballs are crystalline limestone and the pupils almost certainly obsidian.

*Two Pairs of Huge Eyes.* One pair<sup>5</sup> consists merely of the metal frames (copper or bronze) and white limestone eyeballs, the pupils being missing. The frames are about 27 cm. (about 11 inches) long. Another similar pair (no number), also without pupils, are 23 cm. (9 inches) long.

*Pair of Eyes.*<sup>6</sup> The rims are blue glass; the eyeballs are white opaque glass; and the pupils black glass; the rim, eyeball and pupil of each eye are fused together intentionally.

*Pair of Eyes.*<sup>7</sup> The rim (one is missing) is blue glass; the eyeballs are missing; the pupils are obsidian or black glass, but probably obsidian.

<sup>1</sup> Both iris and pupil are missing in one eye.

<sup>2</sup> In one instance the pupil is very dark blue glass, so dark as to appear black by reflected light.

<sup>3</sup> In two cases the iris is partly light-green and partly black, and in a third case wholly light-green; but all three have probably been black originally, the black having decomposed and become green.

<sup>4</sup> No.  $\begin{smallmatrix} 26 \\ 25 \end{smallmatrix} \div \begin{smallmatrix} 3 \\ 3 \end{smallmatrix}$

<sup>5</sup> Nos.  $\begin{smallmatrix} 20 \\ 24 \end{smallmatrix} \div \begin{smallmatrix} 11 \\ 15 \end{smallmatrix}$  and  $\begin{smallmatrix} 20 \\ 24 \end{smallmatrix} \div \begin{smallmatrix} 11 \\ 16 \end{smallmatrix}$ .

<sup>6</sup> No. J.25034.

<sup>7</sup> Nos.  $\begin{smallmatrix} 22 \\ 26 \end{smallmatrix} \div \begin{smallmatrix} 12 \\ 12 \end{smallmatrix}$  and  $\begin{smallmatrix} 22 \\ 26 \end{smallmatrix} \div \begin{smallmatrix} 12 \\ 13 \end{smallmatrix}$ .

*Pair of Eyes.*<sup>1</sup> The eyeballs are broken and partly missing, one consists of crystalline limestone and the other probably of magnesite or magnesian limestone ; the pupils are obsidian or black glass, but probably obsidian.

*Single Eye.*<sup>2</sup> The rim is blue glass ; the eyeball is white opaque glass ; and the pupil black glass.

*Single Eye.*<sup>3</sup> The eyeball is white opaque glass ; the pupil black glass ; and the rim blue glass, now corroded and green on the outside.

*Single Eye.*<sup>4</sup> The rim, eyeball and pupil are all one piece of faience, the rim and eyeball being coated with blue vitreous glaze and the pupil with a black glaze, which is now slightly corroded on the surface.

*Single Eye.*<sup>5</sup> The rim is a fine-grained, soft stone, black and polished on the outside and dark grey inside, which is neither limestone nor gypsum, but almost certainly dark grey steatite, the surface blackening being probably due neither to paint nor dye, but merely to the effect of the polishing ; the eyeball is white opaque glass ; and the pupil black glass. The eyeball is fastened to the frame (rim) by means of black resin, which is also used to fasten in the pupil.

*Single Eye.*<sup>6</sup> This consists of cornea and pupil only, the cornea being transparent rock crystal with a small recess drilled in the middle of the under side, which is filled with dark brown resin.

*Two Single Eyes.*<sup>7</sup> These, which are slightly smaller than the usual eye and of different sizes, are of the normal Class II type, without rims ; the eyeballs are crystalline limestone ; and the pupils obsidian.

*Single Eye.*<sup>7</sup> This is the eyeball alone, which is of crystalline limestone ; in the middle of the front a shallow circular depression for the pupil (which is now missing) has a layer of dark brown resin at the bottom.

*Single Eye.*<sup>7</sup> This is the framework and back of an eye only, in the form of a shallow eye-shaped tray with raised border that had been cut in one piece out of limestone and blackened artificially on the surface.

*Three Single Eyes.*<sup>7</sup> These three eyes are of slightly different sizes, but similar technique, each consisting of a framework with a raised border, somewhat like the previous specimen ; the " tray," however, is not so deep and the bottom of the tray represents the eyeball, in the middle of which is a raised oval-shaped pupil with a convex upper surface. The whole (frame, eyeball and pupil) is one piece of limestone, the entire surface of which has been blackened artificially.

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<sup>1</sup> Nos.  $\begin{smallmatrix} 22 & 12 \\ 26 & 14 \end{smallmatrix}$  and  $\begin{smallmatrix} 22 & 12 \\ 26 & 15 \end{smallmatrix}$ .

<sup>2</sup> No.  $\begin{smallmatrix} 21 & 12 \\ 26 & 16 \end{smallmatrix}$ .

<sup>3</sup> No. J.36218.

<sup>4</sup> No.  $\begin{smallmatrix} 21 & 12 \\ 26 & 17 \end{smallmatrix}$ .

<sup>5</sup> No.  $\begin{smallmatrix} 11 & 5 \\ 34 & 1 \end{smallmatrix}$ .

<sup>6</sup> Submitted by Mr. C. C. Edgar ; no number.

<sup>7</sup> In the Cairo Museum store ; no numbers.

*Single Eye.*<sup>1</sup> Fragment of large eye consisting of an oval pupil (approx.  $7 \times 8$  cm.) and part of the lower rim, both one piece of faience, the pupil being glazed black and the rim blue.

*Single Eye.*<sup>2</sup> This is the frame only, which is of silver, solid and well made and in excellent preservation; after the removal of a thin film of surface discoloration it is as bright and polished as when made. Probably from Beni Hasan.

#### ARTIFICIAL EYES IN MESOPOTAMIA.

In connection with the artificial eyes from Egypt, the artificial eyes of statues and statuettes from Mesopotamia should be mentioned.

The technique of artificial eye-making in Mesopotamia was much inferior to that of Egypt, none of the Mesopotamian eyes being nearly so good as the Egyptian eyes of Class I; they all correspond more nearly with the much poorer Egyptian eyes of Class II, though made of different materials. In the Mesopotamian eyes only the eyeball and pupil are represented, neither the cornea nor iris being shown. The eyeball is made of white shell<sup>3</sup> and the pupil of bitumen, black limestone or lapis lazuli.<sup>4</sup>

The Mesopotamian eye-maker did not use the transparent rock crystal that gives such a life-like appearance to the better class of Egyptian eyes—possibly because he did not know it, whereas it occurs naturally in Egypt and was employed for small vases and other objects from a very early date. Obsidian, too, which was largely used in Egypt for the pupils of human eyes and for the entire eye of birds, though known in Mesopotamia, was not employed for eye-making, its place being taken by bitumen, which though considerably the easier of the two to work has a dull, dead appearance compared with bright, polished obsidian. Resin, also, which was sometimes employed in Egypt for the pupil of the eye, also under the cornea to give colour to the iris, and as a cementing material to fasten the various parts of the eye in place, was not used for any of these purposes in Mesopotamia, bitumen being employed instead. Glass, so frequent in Egypt in eyes of Graeco-Roman date, was not used at all for eyes, so far as is known, in Mesopotamia.

A. LUCAS.

$$^1 \text{ No. } \frac{31+12}{26+8}$$

$$^2 \text{ No. } \frac{4+8}{25+6}$$

<sup>3</sup> One instance of the use of "yellow paste" is known.

<sup>4</sup> H. Frankfort, "A Great Discovery of Sumerian Sculpture," *The Illustrated London News*, May 19th, 1934, pp. 761, 774-8, 802.



ARTIFICIAL EYE IN PETRIE COLLECTION, UNIVERSITY COLLEGE, LONDON.  
(3.25 cms. long.)

Mr. Lucas is evidently not aware of a glass eye, now in the Petrie Collection at University College. This eye has a border of blue (probably cobalt by the

colour) and the iris is black. The shape and size of the eye, as well as the fact that the edges are carefully rounded, show that it was for human use. Eyes for insertion in statues and coffins have sharp edges totally unlike this example. It is not surprising that Mr. Lucas should not have known of this eye as it has never been published and is too insignificant in size and appearance to attract attention in a museum case.

M. A. M.

#### A TEMPLE SEAL AND ITS CONNECTIONS.

THE bronze seal illustrated in fig. 1 is shown by the inscription on the base—*pr. Imn*—to have been used in the temple of Ammon, probably at Thebes; the figure seated within the sloping bars of the handle is that of the god himself, with his characteristic head-dress. The exact provenance of the seal is not known; it came into the hands of a Cairo dealer together with several fragments of similar seals. Its height is  $2\frac{1}{4}$ " and the base is not quite  $1\frac{1}{4}$ " square; the god's face and head-dress have been rubbed down by much handling and the ring for suspension is worn thin. (Cf. fig. 178, pl. LX, of *Objects of Daily Use*, also the seal, without a number, above it.) To propose a fixed date would be

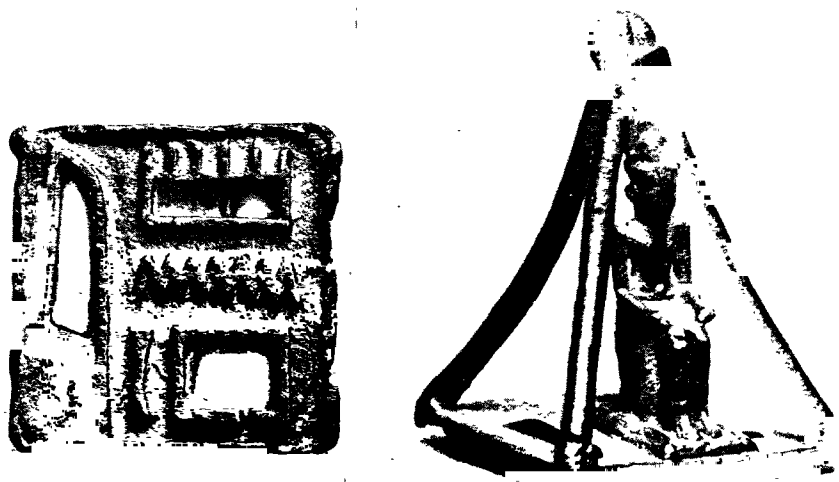


FIG. 1.

(1/1)

hazardous, but it might well belong to the XIXth dynasty. It doubtless served to seal up the doors of a shrine or receptacle for objects of sacred use, in the manner illustrated by Dr. Howard Carter in *The Tomb of Tut . ankh . amen*, vol. II, pl. LX ; a cord was tied round two staples, one on the door and the other on the frame, a dab of damp clay on the cord was then impressed with the seal to act as a safeguard against unauthorised opening of the door. It will be remembered that the daily ritual of worship at the sacred shrines, of which M. Alex. Moret has given an account in *Le Rituel du Culte Divin journalier*, began with the ceremonial breaking by the priest of the protecting seals before he opened the door and proceeded to the rites connected with the divine image.

Protection by a mere lump of clay would seem weak and, of course, was so for a determined thief or desecrator, but against less bold spirits it was ample, for the clay impression was charged with the dangerous power accompanying a holy name, and whoever broke it incurred the sacred wrath—he broke, in fact, a terribly strong *tabu*, and none but a hardened malefactor would risk the consequences of such an act.<sup>1</sup>

The use of seals apparently came from the racial element, whatever it was, which gave to the ancient Egyptian language its Semitic complexion, for the word *khetm*, commonly used in the Old Kingdom, is purely Semitic ; moreover, the first form of seal used in Egypt appears to have been the cylinder which was current in Semitic countries, for the hieroglyph denoting a seal consisted of a picture of a cylinder with the loop of string to which it was attached. The foreign form gave way before the end of the Old Kingdom to the handier stamp-seal and only survived as an amulet, whereas in Mesopotamia its original use was maintained till the end of the Persian rule, affording, no doubt, another illustration of the maxim that the country in which any artefacts or practices most vigorously survive is usually that in which they originated.<sup>2</sup>

The relegation of the cylinder to mere amuletic use introduced no new principle, for it had always been endued with an inherent talismanic quality ; the first Egyptian examples, about the beginning of the Dynastic period, served evidently as amulets, usually of a funerary nature ; in some cases several have been found together, bearing the same name but with varied funerary inscriptions—they certainly could not have been made for seals. Even in commercial Mesopotamia the seal always retained its religious character, sanctified with the names of great divinities ; the sacred theme was an essential component and the first, at least in some instances, to be engraved on the stone, as we may see from specimens which had been prepared for sale, but left unfinished, with blanks to be filled with the purchasers' names.<sup>3</sup> This character was maintained till the coming of the Persians, a conquering people of Aryan speech and more rationalistic in thought, who mostly banished religious themes from their amulets, substituting scenes of war and the chase.

An examination of the development of the engraved cylinder from its earliest appearance gives good reason to conclude that in its first origins it was purely amuletic. The earliest examples, from Kish and elsewhere in Mesopotamia, bore no names ; they were probably developed from the long cylindrical beads, so common at that period, which themselves had doubtless, like most or all early beads, an amuletic as well as a decorative value. They were often made of costly stones such as carnelian, and especially of that very precious mineral lapis lazuli, brought from the distant mountains of Badakshan (now north-west Afghanistan). Another material, sea-shell, was much used ; it appears in the

very earliest times and was perhaps the first of all materials shaped into cylinders for, besides being easy to cut, it had gained even in Palaeolithic times the amuletic and decorative values that we find in beads. It may be suggested that the further development from cylinder to seal was as follows: to make the amulet more personal and therefore more efficacious for its owner, his name would be added to it, and it would soon be found that the bead thus engraved could serve as a seal to give the clay documents to which it was applied a voucher of authenticity, or to effect, easily and quickly, a sacred *tabu*. If this view be correct it follows that the theory which places the origin of the cylinder seal in the joint of a reed is untenable and that the use of wood and reeds, of which traces have been found in Egypt, was a later development for common use.<sup>4</sup>

After the Old Kingdom the cylinder, as a talisman, yielded in popularity to the so-called "button-seal," which would be more rightly named the "button-amulet." These objects first appear in considerable quantities in the First Intermediate Period, following the breaking up of the Old Kingdom. They have been found early outside Egypt, and it has been suggested that they were importations from abroad, at first rare, introduced by the people who were then invading Lower Egypt. But Mr. Guy Brunton's recent excavations at Qau have proved that they were mere amulets, usually attached to the person by a string passing through the loop at the back, that they were in common use, of local make, and engraved with local subjects (Sir Flinders Petrie, in fact, had noted the last point in *Buttons and Design Scarabs*, p. 4, par. 6). It is hardly surprising that they should first have been considered as foreign, so new are many of the types. The very violent revolution that ended the Old Kingdom must have given the classes below the rank of courtiers a freedom never before touched and made possible for them the enjoyment of things previously unattainable, as Brunton's grave-finds attest (see his remarks in *Qau and Badari*, I, p. 75, par. 184). Amulets were now used in countless numbers and of many kinds; the "button" variety, which is found sparsely at the end of the Old Kingdom, became common and displayed many kinds of design, mostly of familiar type and sometimes clumsily copying scraps of inscriptions on sacred buildings, while occasionally, as stated above, they show a quite new character largely unintelligible to us. But they were all indigenous, for the intelligible ones display Hathor symbols, *onkh*, lions, and so on; they thus had a magico-religious character which there is little doubt was shared also by those that we cannot understand, which may represent religious ideas of a popular kind that did not filter through into the official cult.<sup>5</sup>

The loop at the back of the button-amulets was also often pressed into amuletic service, being fashioned into a small carved figure, sometimes in the round.<sup>6</sup> Among these figures was the *scarabaeus* beetle, which had long enjoyed a degree of sacredness derived in all probability, in spite of the very late Greek ratiocinations, from its name, *kheper*, which connected it with an essential form of the Sun-god as Lord of Being or of Forms (*khepri*—he is even represented as a beetle under this name in MSS. of the New Empire).<sup>7</sup> This sacredness soon ensured for the scarab form of amulet-seal a great predominance over the other forms, and it may be argued that here we have the origin of the scarab amulet of the conventional type which was made in vast quantities from the Middle Kingdom till the Saitic period and, uninscribed, through the Ptolemaic period.<sup>8</sup> It spread, like other elements of Egyptian influence, to foreign countries in the Eastern Mediterranean area and was largely manufactured by the Phoenicians.<sup>9</sup>

In the Middle Kingdom the practice began of inscribing owners' names

on the bases of scarab amulets, as part, perhaps, of the general return, with more settled times, to ancient ways: before this period inscribed cylinders were employed, but scarabs were now the fashion and the cylinder was mostly discarded.

At this time, too, the names of kings were frequently engraved on the bases of the scarabs, for kings were gods and their names were endowed in popular imagination with strong and active virtues. It would seem, too, that scarabs gained in amuletic power in proportion to the greatness of the king whose name they bore, a principle that may account for the extraordinary numbers that have been found engraved with the name of Thothmes III, the Napoleon of ancient Egypt. It must be borne in mind, however, that the vast majority of scarabs, like other amulets, bear no names of persons, royal or otherwise.

The theory outlined above may be thought to be weakened by the fact that a few rare scarabs of the conventional type have been found inscribed with names of kings who reigned before the appearance—as far as we now know—of button-amulets. Different views are current about such scarabs, some holding them to be contemporaneous with the kings whose names they bear, while others consider them of later make, mainly archaisations of the Saitic period when the fashion was all for ancient things.<sup>10</sup> That the worship of older kings is known, in at least some cases, to have survived to later times, supports the latter view, a well-known instance being that of Amenhotep I, who was revered as protector of the Theban necropolis. Sir Flinders Petrie, in *Ancient Egypt* (1917, part IV, p. 170), has pointed out that there were found at Gurob many stelae of adoration of Thothmes III that were made in the much later period of Rameses II. The stela in pl. XXIV, 11, of *Illahun, Kahun and Gurob*, erected for a Royal Scribe, Rê.mes.m.per.Amûn, may be quoted, although Sir Flinders, in this earlier publication, thought it to be of the XVIIIth dynasty (*Op. cit.*, p. 20, end of par. 40). It should be noted that the king is entitled “the Good God, Lord of the Two Lands,” the title used only for living kings, dead ones being called “the Great God.” Again, Barsanti in *Ann. du Serv.*, vol. XIII, p. 255, described a stela of the XIXth dynasty inscribed with an adoration of King Teti, one of several from his pyramid.<sup>11</sup> A case of special interest is that of King Shepseskaf (IVth dynasty), whose cult was suppressed, perhaps because he was unorthodox in respect to the Solar cult which reigned supreme in the next dynasty; it was revived, however, in the XIIth dynasty by a butcher’s family, who seem to have found it a source of profit.<sup>12</sup> On the other hand, if material evidence were produced that the scarabs in question were contemporaneous with the kings whose names they bear, the theory suggested here would fall to the ground, unless button-amulets of the same or earlier periods were to come to light. But this material evidence would require the discovery of tombs of the Vth or earlier dynasties containing some of their original grave-goods, and for this we can hardly hope. In any case the scarab must have had some definite origin and development which it is difficult to imagine except in some such way as here outlined.

On the whole, present evidence may be taken to justify the tentative conclusion that scarab amulets were evolved from an earlier form, the button-amulet; the latter arose in Egypt at the end of the Old Kingdom, their backs were adorned with various carved figures of magico-religious significance, including the scarab-beetle; the latter, on account of its high sacred connections, gained pre-eminence over the rest; the other forms disappeared but not without

leaving a numerous progeny, for the amulets of the New Empire and later are often developments from the button form.

The amuletic origin of the scarab is well explained by Sir Flinders Petrie in *Scarabs and Cylinders with Names*, chap. 1, par. 7. Though in *Scarabs* Dr. Hall begins with emphasising their use as seals, he says later (p. 5): "Scarabs could be used as seals, of course, and were so used, but primarily all were amulets." As Sir Flinders has pointed out from actual remains, their use as seals was exceedingly limited—occasional, not regular. A good collection of XIIth dynasty sealings from scarabs is to be seen in pl. IX of *Illahun, Kahun and Gurob*; they are mostly without names and clearly amuletic in character, although at this period scarabs inscribed with names are far more common, proportionately, than in later times. The so-called seals discovered at Mohenjo-daro and Harappa in India are in the same position as scarabs; Mr. Ernest Mackay, discussing them in the publication of those sites (pp. 379-382), comes to the conclusion that they are in fact amulets, but commonly used as seals: Sir Flinders Petrie, however, interprets them as belonging to certain offices (*Ancient Egypt*, June, 1932) and not to individuals, comparing them in this respect to some Egyptian seals of the Protodynastic period.



FIG. 2.

(1/1)

That early Mesopotamian cylinders were of the same nature as scarabs is clearly shown by the pre-Sargonic grave-finds at Kish recorded by Mr. Mackay in his *Report on Cemetery "A"* (Chicago, 1925; p. 28). Some were much worn, none bore names, the subjects engraved on them were men and animals, often lions seizing prey; all were mythological; the animals were frequently presented in files, as on early Egyptian cylinders and other objects, and could have had no meaning as seals.<sup>13</sup> The material was mostly shell which, as we have seen, had very early gained an amuletic value in addition to its attractiveness for decoration—virtues which belonged also to the other materials, carnelian and lapis lazuli, but in a higher degree on account of their greater rarity and superior qualities. Lastly, the early cylinders were worn on a string round the neck; like Indian specimens, they were often too thin to have served as seals just as, similarly, the scarabs and button-amulets were of too awkward a shape for handling to have been intended for sealing. From all these circumstances we



may infer beyond reasonable doubt the original talismanic nature of the objects under discussion. This conclusion is further fortified by other examples of both cylinders and stamp-seals in the Near East, such as the Hittite seals, published by D. G. Hogarth, the Elamite, of both the early Susian periods, published in the *Mém. Dél. Perse*, the public collections in Paris, published by Delaporte, and many others. From these a few specimens of outstanding significance may be culled: the cylinder illustrated in Pl. 6, no. 22, of the *Guide* to the Louvre collection is shown by the inscription to have been a charm against illness; another in the British Museum was dedicated by Killula the *guzalû*, to the god Meslamtaea for the preservation of King Dungi of the IIIrd dynasty of Ur (L. W. King, *History of Sumer and Akkad*, p. 284, and illustration opposite p. 246). On the hemispherical seal of chalcedony (fig. 2), of a type common from the Assyro-Babylonian period to the Sasanian, the head of Christ is engraved, encircled with a halo and with a cross in the field on each side; underneath are cut, in Semitic characters, the letters *SM*, signifying "The (Holy) Name"; it has replaced the religious subjects of the usual Mesopotamian seals, which in the later times often consisted of scenes of priests officiating at altars of various deities; like them, it could only have served as an amulet for its owner. (It was procured many years ago from a Turkish pilgrim from North Syria on his way through Egypt to Mecca.) In this connection we may recall that while the earliest Mesopotamian cylinders bear no names and are simply amuletic, the field in the later Babylonian specimens, which bear personal names, is occupied with religious scenes, often taken, as it is now beginning to appear, from the ritual ceremony of the New Year; this ceremony was held to be of vital importance for the prosperity of the nation, the king's power also being considered incomplete if he did not take part in it from year to year. It is therefore clear that the amuletic virtue originally attributed to engraved cylinders was now represented, on a higher plane, by pictures connected with the activities of the great national gods.



FIG. 3. (1/1)

Fig. 3 shows a cylinder-amulet which represents a Bes-like creature of an exaggerated type, like the Phoenician, and on each side of him a figure performing acrobatic feats much like the dancing girls in some of the old tomb-scenes of Egypt. It was procured in Cairo and is now in the Ashmolean Museum (No. 1921-1199). The collection of oriental cylinders and seals in the Bibliothèque Nationale of Paris contains a cylinder of unknown provenance exhibiting the same acrobatic figure (Delaporte; *Catalogue*, No. 515); next to it is a Bes-like figure holding a baboon by its paw and round it are other figures, such as a bee and the twin ox-protome, of a style pointing to the late Predynastic period of Egypt, to which, accordingly, the Ashmolean example may be attributed.<sup>14</sup> Such cylinders can never have served as personal seals. Lastly, a specimen of glazed frit-ware published in *The British Museum Quarterly* (vol. VII, part 1, p. 6), represents the mating of cattle and served doubtless as an amulet to procure

fertility; it was certainly never a personal seal. It is perhaps a forerunner of the similar figures moulded in sugar which used to grace the stalls at fairs ("moolids") in modern Egypt.

The idea underlying the use of the temple seal is seen to be at the base of the various seal-like amulets which have come under discussion, and the interpretation of both alike throws valuable light on the early workings of the human mind as displayed in the matter of *tabus* and names or words of power. The illustration is carried further by the fact that in the Later Period the stamp-seal, on account of its sacred connections, was made to serve as an amulet, miniature models being made of it in glazed frit-ware<sup>15</sup>; a special form, used in the necropolis and engraved with a jackal couchant and nine captives,<sup>16</sup> was likewise copied in frit and used as a charm. Thus the sacred seal became, like many another thing of holiness—and not in the ancient Near East only—a mere amulet within the reach of any purchaser.<sup>17</sup>

#### NOTES.

1. The power of the *tabu* among peoples of backward culture is, to the more advanced, amazing; in the Pacific Islands a twig or leaf tied ceremonially to a house, tree or other object will have all the effect of the holy name in the more advanced community of ancient Egypt. Captain James Cook found that the setting up of *tabu*-marks, such as wands, gave more protection for his purposes than even the dreaded fire-arms of his mariners. In Timor "a palm-branch stuck across an open door showing that the house is tabooed is a far more effectual guard against robbery than any amount of locks and bars" (A. R. Wallace, "The Malay Archipelago," from Hastings's *Enc. of Religion and Ethics*, vol. XII, p. 182, par. 6).

In ancient Egypt, however, the great riches laid up in the tombs of the mighty subdued the fear of the sacred seal, and robberies were always rife, compelling the authorities to post guards in the cemeteries. Similarly, in modern China when, about the end of last century the driving of railways through ancient tomb-mounds produced none of the evil results that were feared from outraged spirits of the dead, the rifling of the tombs spread rapidly—to the great enrichment of European art-collections.

2. It may be noted that the people of Mesopotamia were keen traders from the beginning of their history and probably the first to use seals for commercial purposes. In non-trading communities their use must have been very restricted, for few men outside religious and administrative circles would have need of them.

3. For one example, see the *J. of Eg. Arch.*, vol. VIII, pl. XXIII, no. 4 and p. 209 (Sidney Smith).

4. The suggestion has been made that the cylinder-amulet may have been derived from the cylindrical envelope which protected little rolls of papyrus inscribed with texts as amulets to hand round the neck, a prototype of Jewish phylacteries; the owner's name may have been inscribed on such envelopes—but no example has been found. The suggestion made in the text is to be taken as a probable deduction, fitting in with known psychological elements.

5. Besides the reference in the text to Sir Flinders Petrie's note on button amulets—written, it should be observed, before Mr. Brunton's discoveries shed so much new light on the matter—the latter's *Qau and Badari*, I, ch. xx; II,

ch. xxx, adds considerably to our knowledge of the use and meaning of these charms. For example, we may note (vol. I, p. 74, par. 181) the much greater use of them by women than by men, doubtless owing to the supposed greater liability of women to dangerous attacks from the mysterious powers of nature, an idea still current among peoples of backward culture.

6. For figures in the round see *Sedment II*, pl. LVIII, no. 1, a figure formerly supposed to represent a scribe but now recognised as the mother-goddess (Hathor, perhaps, or Isis) nursing a child; also *Qau and Badari*, I, pl. XXXIII, nos. 109-129, fig. 111, of copper, representing a monkey, is specially interesting and may be compared with the charming little human figures in copper (or bronze) published by Mr. Glanville in the *J. of Eg. Arch.*, vol. XVII (May, 1931), pl. XII and pp. 98ff, which are late and unusual developments from the earlier class.

7. The oldest object of beetle-shape so far known seems to be an alabaster case dating from the end of the Predynastic period; Petrie, Wainwright and Gardiner, *Tarkhan*, I, p. 22; pls. III, 4; XIV, 9.

8. The earlier specimens of the conventional type of scarab are shown in the plate above referred to in Mr. Brunton's work, nos. 130ff.

9. See Dr. H. R. Hall's pamphlet, *Scarabs* (published by the British Museum), p. 13.

10. See, for the former view, Sir Flinders Petrie in chap. VII of *Scarabs and Cylinders with Names*, and for the latter, Dr. H. R. Hall, *Scarabs*, p. 12, ff.

11. See *J. of Eg. Arch.*, vol. III, p. 263.

12. See *J. of Eg. Arch.*, vol. XII, p. 290.

13. See G. Bénédite in *Monuments et Mémoires; Fondation Piot*, t. 22, pp. 1, ff, and J. Capart, *Débuts de l'Art en Egypte*, 1st ed., p. 145, fig. 104.

14. The figures of dancing girls on these early amulets might favour the theory that dancing, such as that represented in tombs of the Old Kingdom, had a religious complexion. See the *Bulletin of the Metropolitan Museum of New York* on the Egyptian expeditions of 1925-7, and *Ancient Egypt*, 1928, p. 59.

15. Rough examples appear in Sir Flinders Petrie's *Amulets*, pl. VI, no. 79, and in *Objects of Daily Use*, pl. LX, nos. 174-5. Other specimens are modelled with all the structural features of the pyramidal form shown in our illustration.

16. See Dr. Howard Carter, *The Tomb of Tut. ankh. amen*, vol. I, pl. XIV, no. 3.

17. The vast numbers of amulets that have come down to us make it clear that the Egyptians were always strong believers in their powers. It is probable therefore that they were only made by temple priests or attendants (Latin, *minister*) who would be able to impart to them, by blessings or incantations, a share of the sacred nature of the temple. It is hardly likely that rooms for the sale of such objects will ever be definitely identified in or near the ruins of temples, though they may well have existed, the ancient equivalents of the shops for the sale of articles of piety that cluster round many cathedrals in our days; but Mr. Quibell found in the "Bes Chambers" of Saqqâreh proofs of the manufacture of certain amulets on sacred ground (*Excavations at Saqqara*, vol. I, pp. 12-14). Further possible evidence of another centre of such manufacture connected with a shrine of Hathor in the XVIIIth dynasty has been suggested by the present writer in *Man*, vol. XXVI (May, 1926), p. 81.

G. D. HORNBLOWER.

## THE OBELISK BARGE OF HATSHEPSUT.

## A CONJECTURAL DESIGN BASED ON RULES EVOLVED FROM AN ANALYSIS OF THE LINES OF THE XIIth DYNASTY FUNERARY BARGE.

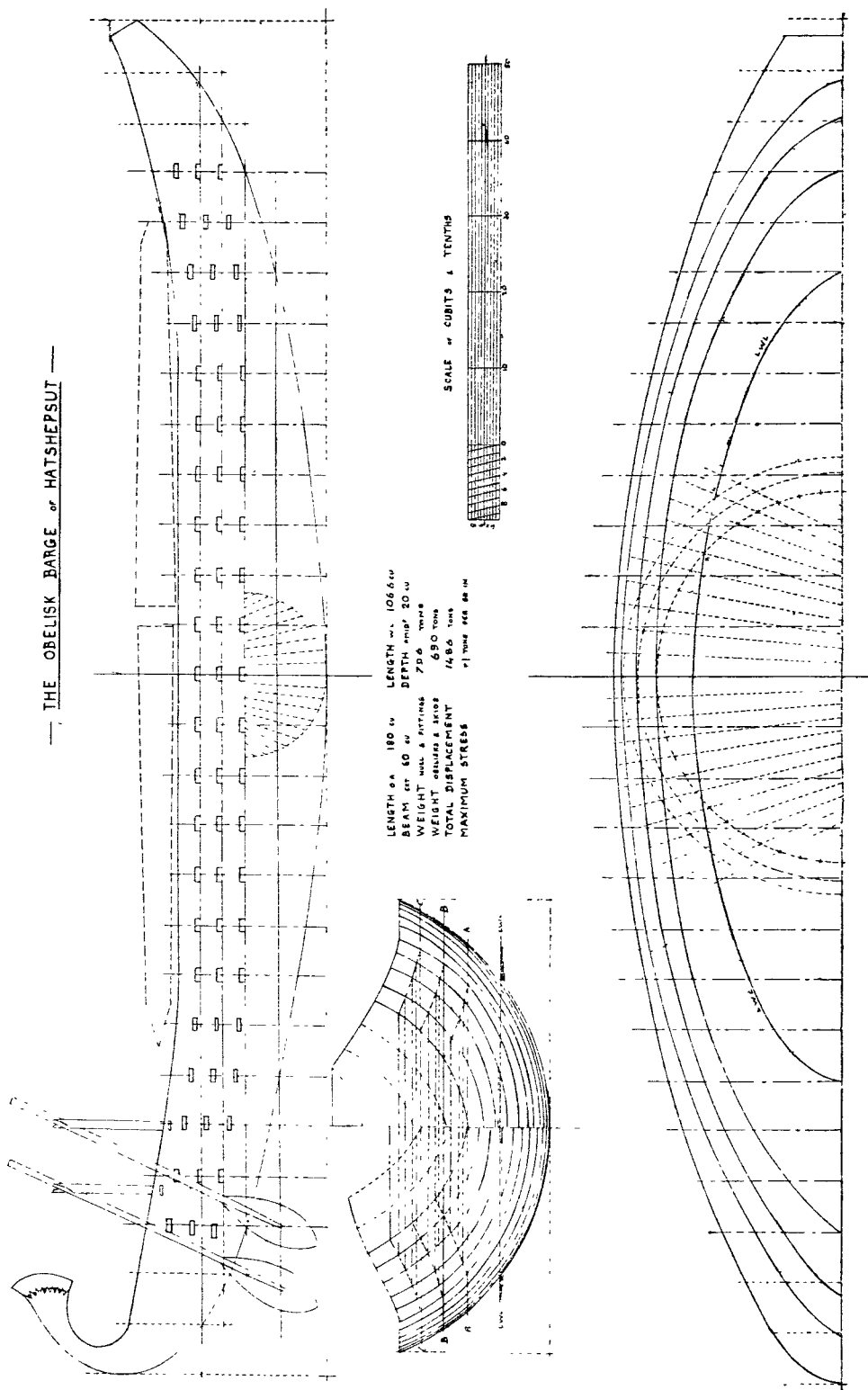
OWING to the frameless structure of Egyptian ships, their design must have been evolved by a set of rules. An analysis of the lines of the XIIth dynasty funerary barge has given the foundation for such a set of rules (*Ancient Egypt and the East*, 1933, Parts III, IV, pp. 100-111), and if the theoretical and the actual agree it may be taken that these rules, if not the ones that were in use, form at least a good working substitute which is sound in principle.

The barge built by Senmut to carry the two obelisks for Queen Hatshepsut is an excellent study to which the rules derived from the funerary barge may be applied. There is a carving at Deir el-Bahri with which the result may be compared.

Before commencing to re-design this lighter it will be well to state briefly the rules for design. Firstly, the overall length was chosen. The greatest width was a proportion of this length, usually  $\frac{1}{3}$  to  $\frac{1}{4}$ . The depth from the gunwale to the bottom of the keel was  $\frac{1}{3}$  the greatest breadth. The length of the midship beam was determined by a drawing; also the total number of the deck beams was known. Using half the length of the greatest beam as a radius, a quadrant of a circle was drawn; the base and the arc were each divided into the same number of equal parts, the actual number of parts being two or three more than the number of beams before and abaft the midship beam. Corresponding divisions in the base and the arc were joined, and the length of the joining lines gave the half-length of each beam. The resulting curve through the ends of the beams was termed the "beam curve," and gave the deck plan of the ship. To get the shape of the keel, the beams were put into position with a constant proportion of their length below to give the curve of the keel. The shape thus arrived at is a distorted form of "beam curve." If the beams lay in a straight line the curve would be a "beam curve," but owing to the beams rising at each end to follow the sheer of the deck, the curve of the keel becomes correspondingly raised. The shape of the midship section was determined by filling a certain length of rope with planking and pulling it in until the planking came to the beams. The length of the rope to be filled was again dependent on the length of the beam.

These rules for design as deduced from the funerary barge naturally reproduce that barge when applied.

To apply them to the design of the obelisk barge of Hatshepsut it is desirable to make one or two modifications, which though not affecting the principles of the rules make for convenience in drawing. The carving at Deir el-Bahri shows three tiers of beams. The lowest tier will be taken as the base for the design; this tier would obviously have been the first to be put up. The sections of the ship will be taken as circular arcs, passing through the keel and the beam ends—but solely for convenience in drawing and making calculations. The shape of the keel will be obtained by using a "beam curve" direct on a base through the underside of the lowest tier of beams; this again is to facilitate drawing, instead of setting down a proportionate length of beam below. Apart from these departures, the above stated rules have been strictly kept in the following reconstruction of the barge of Hatshepsut.



During the XVIIIth dynasty there were two barges built for the conveyance of obelisks. The first was built by Ineni to carry a pair of obelisks for Thothmes I ; the other was built under the supervision of Senmut to carry two larger obelisks for Hatshepsut. Of these two barges Ineni gives the size of his as 120 cubits by 40 ; whereas Senmut shows a lovely picture. In both cases the actual obelisks are still in existence, Thothmes' 64 feet long and Hatshepsut's 97 feet.

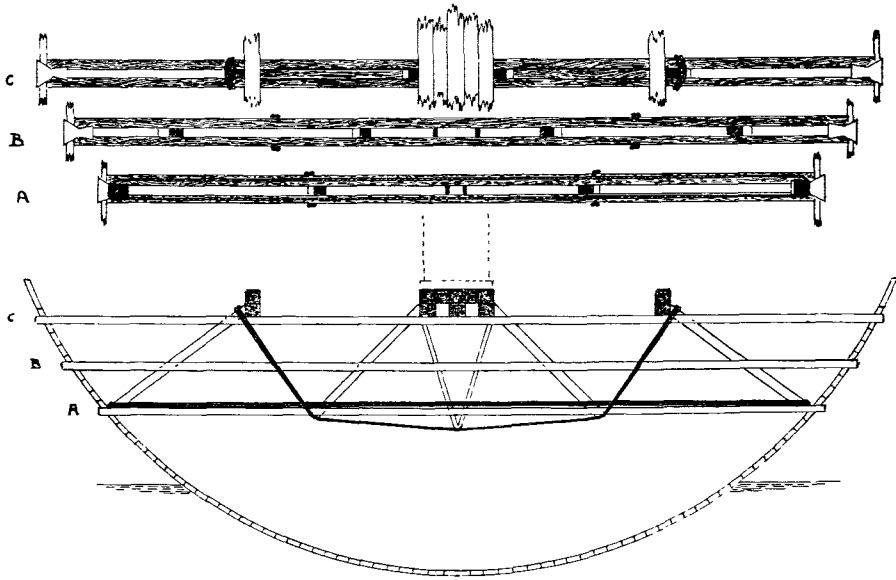
Taking a proportionate length Senmut's lighter should be  $\frac{9\frac{1}{4}}{4} \times 120 = 181\frac{3}{4}$  cubits. The length of Senmut's lighter may be taken as 180 cubits ; the breadth will therefore be 60, and the depth from gunwale to keel will be 20 cubits. These are the main dimensions of the barge.

Reference to the Deir el-Bahri carving shows that there were three tiers of beams, and 22 beams in each tier. To choose a simple figure, let the underside of the beam tiers amidships be fixed at 3, 6, and 9 cubits below the gunwale. A drawing of an arc of a circle with a chord of 60 cubits and a depth of 20 gives the shape of the midship section and also the length of the midship beam of each tier. If the beams be numbered 1 to 22 from forward, number 11 may be taken as the midship section. The length of the midship beam works out at 48 cu. 5 palms. This is tier A as shown in the drawing (fig. 1).

There are to be 22 beams, and these may be allowed to extend over a length of 140 cubits leaving 20 cubits at each end. The spacing of the beams centre to centre will be  $6\frac{2}{3}$  cubits. To obtain the length of the beams use the half-length of the midship beam as a radius and draw a semicircle ; that is, one quadrant for the fore end and one for the after end. As there are 22 beams, there will be 10 beams before the centre and 11 beams abaft the centre, since No. XI has been made the middle beam.

According to rule, the base and the arc are each divided into a number of equal parts, this number being more than the number of beams. In the case of this ship three more divisions are taken, so the forward quadrant is divided into 13 spaces, whilst 14 is the number of spaces for the after part. Corresponding points on the base and the arc being joined, the lengths of the joining lines are the half-lengths of the beams in the lower tier. To obtain the beam lengths for the two upper tiers, B and C, the easiest method is as follows : take the length of the centre half-beam from the midship section in each case. These half-lengths measure 26.72 cubits and 27.86 cubits respectively. Use these half-lengths as radii and draw two concentric semicircles outside the original one. Extend the joining lines of the lower tier until they cut the outer circles and use the lengths thus obtained as the half-lengths of the beams in tiers B and C. The rules for design as obtained from the funerary barge only applied to a normal ship with one tier of beams. This lighter is an abnormal ship, and the most convenient method of getting beam lengths may be justifiably used. The beam lengths being known, the next step is to determine the rise of the beams at the ends of the ship to give a reasonable sheer. Here some quite simple rule can be adopted. A convenient sectional area for each beam is  $2 \times \frac{1}{2}$  cubits. Place beams V to XVII on a straight line, leaving four beams forward and five beams aft to be lifted above the general level. The most simple proportion in which to raise the beams is  $\frac{1}{2}$  a cubit, then 1, 2, 3, 4 cubits. By these methods three points on each side at every beam station have been found, and are put into the body plan of sections.

The next step is to determine the shape of the keel. By rule, a constant proportion of the length of each beam should be set down from the lowest tier.

FIG. 2.—MID SECTION. ( $\frac{3}{4}$ "=10 CUBITS.)

This, of course, would make the curve another beam curve if all the beams were in a straight line. As, however, the beams themselves rise above the level and also the proportion at the ends is slightly decreased, the curve so obtained would be rather steeper at the ends than a true "beam curve." A departure from the rule in practice but not in principle is justified here; a new beam curve using the depth below tier A, that is 11 cubits, as a radius is drawn. In order to make the ends steeper use the exact number of spaces instead of a greater number, as was done in obtaining the deck plans. For the forward end 10 divisions of the arc and base are taken, with 11 divisions for the after part, which makes the line of keel pass through the level of the lowest tier of beams at each end beam. This method gives a fair compromise on that called for by rule and is also less trouble to draw. Enough points have now been obtained to draw arcs of circles for each section and so to complete the body plan. There still remain 20 cubits at each end of the ship beyond the beams to be accounted for. These ends can be finished off to look well, and also a nice sheer line for the top of the gunwale can be drawn in.

The completed drawing in fig. 1 gives the shape of the big lighter as it would have been according to the rules that we believe obtained for shipbuilding in ancient Egypt. It has now to be seen whether it would have been a suitable vessel for the purpose for which it was intended. To find this out, the weight of the hull and load must be calculated, for which modern theoretical naval architecture must be called in. Senmut, of course, had no need to make calculations; he simply placed his two obelisks on board and saw that the barge floated at a proper trim. With a design only on paper calculations must be made; and we must be satisfied that the ship was strong enough to carry the load.

It would be out of place here to give all the calculations in detail; the results only need be quoted.

Unfortunately, or may be fortunately, there is no information whatever on the interior of this great barge. It is therefore possible to choose any convenient structure that is strong enough to carry the load. Fig. 2 shows a

possible arrangement. The hull as in all Egyptian ships is without framing. This means that it must be considered as an arch, and the load must be carried on deck, *i.e.*, on a trussed girder. That the Egyptians were familiar with the use of rope trusses is shown by the hogging trusses fitted in sea-going and cargo ships; that they used diagonal struts is proved by examples of furniture in which light diagonal bars are fitted to carry the load. In the proposed framing only the top and bottom beams are taken as part of the girder. Four diagonal struts are required, and the two centre ones under the obelisk have no load on them until the vessel rolls. Rope bracing where shown is used for those parts of the girder which are in tension. The beams are made up of two side-pieces with the centre filled in solid where the greatest pressure comes. The greatest load comes out at about 1,500 lbs. pressure per square inch, which though rather high for timber is by no means an impossible load. The centre tier of beams is used only to tie the sides of the ship together, and does not help directly to support the load. A strong fore and aft platform forms a beam on which the obelisks rest, and gives longitudinal strength to the hull. Two side girders also hold the ship together and act as a lodgment for the outer struts. The whole structure would be firmly pegged and tenoned together in the usual Egyptian manner. The drawings show the plans of each beam, as well as the section of the ship.

No deck is actually shown in the drawings, but one must be allowed for, as the gangs of labourers must have had somewhere to stand when dragging the obelisks on board. It really need not extend to the sides; between the centre and side girders would give ample working space. Another point to be borne in mind is that all the beams had to be lifted by man-power into their places; the Egyptians had no cranes or screw-jacks. The size of the timber is consequently limited by the weight that one man can lift. The cross-section of the beams is arranged to be  $2 \times \frac{1}{2}$  cubits and the weight of this is about 140 lbs. per foot run. One man on each side of the beam, and a pair of men every two feet, would give each pair of men 280 lbs. to support, a load that can be man-handled without undue effort.

Having arranged for a suitable transverse section the only remaining detail to be settled is the thickness of the planking. Let this be taken as 2 palms, or about 6 inches. This thickness can be modified later if it is found that the hull is too heavy, or the strength is deficient.

With these points decided on it is possible to calculate the total weight of the ship and the position of its centre of gravity. The calculation is more tedious than difficult. The results in English tons are:

Planking of bottom, including gunwales	..	..	344.89	tons
Truss girders and tie-beams to carry obelisks	..	..	154.20	„
Fore and aft girder under obelisks and at sides	..	..	160.93	„
Decking at ends and working platforms	..	..	77.90	„
Rudders, 4 in number	..	..	28.16	„
Truss ropes fore and aft	..	..	15.00	„
				<hr/>
Total for lighter	..	..	781.08	„
Obelisks and skidding for transport	..	..	690.00	„
				<hr/>
Total weight	..	..	1,471.08	„



In addition, a small allowance for the crew and minor deck erections must be made, for which 15 tons should be ample, making a grand total of 1,486 tons.

As the total weight of the loaded ship is now fixed it is possible to ascertain the water-line at which she will float. To do this draw a line at a guess and calculate the volume of the hull below it; also calculate the position of the centre of gravity of this volume. The volume multiplied by the weight per cubic foot of water gives the displacement weight of the ship and its load, and this must be equal to the total weight. If the line chosen does not give this equality, another must be drawn until a balance is achieved. The centre of gravity of the displacement volume must also come vertically under the centre of gravity of the hull and load. Adjustment can be made in this latter centre by altering the position of the obelisks on the barge.

The water-line shown in fig. 1 cuts off a displacement of 1,486 tons, and the position of the obelisks has been so arranged that the two centres of gravity are in the same vertical line. In other words, the drawing shows correctly how the lighter will float. The maximum draught at this level is 6·7 cubits, or 11·54 feet. This is not too deep for successful navigation on the Nile.

It has now been shown that by using the rules derived from the funerary barge a design for a lighter to carry two obelisks end on can be arrived at. The next question is whether the lighter having a construction as shown in fig. 2 would be strong enough to carry the obelisks. The forces on the lighter are due to the load pressing down and the water pushing up. Owing to the overhangs and also the comparatively uniform load, the tendency is to hog the barge; that means the barge wants to bend so that the ends droop, and the centre comes up. The greatest upthrust of the water is amidships, and it diminishes to nothing at each end of the water-line. The keel of the barge will be in compression, and the gunwales and the fore and aft girders will be in tension, the maximum tension amounting to about 250 lbs. per square inch. This hogging strain is further relieved by the fore and aft rope trusses fitted above the obelisk.

A further point to be considered is whether the barge when loaded would have floated upright, or whether it would have been top-heavy. On account of the circular sections, all the lines of pressure of the water act through the centre of the circular arc, which is  $12\frac{1}{2}$  cubits above the gunwale line. The load lies well below this point, so that stability is assured.

The lighter as designed is thus satisfactory in all respects, and would do the work required. The rules for design do evolve a suitable ship; but is this ship anything like the one that Senmut built?

It must here be assumed that the carving at Deir el-Bahri is an accurate drawing to scale of Senmut's barge. In fig. 3 our design is brought to the same length as the picture of the carving in Naville's "*Deir el-Bahri*" (Egypt Exploration Society's publication). On superimposing a tracing of this picture of the carving (fig. 3A) over the design (fig. 3), the agreement between the two is seen to be remarkable. The water-line in the carving is exact in position, though a trifle longer aft than in the design. The bow of the design which was put in to please the eye is perhaps rather higher than Senmut would have wished. The position of the beams, particularly amidships, corresponds nearly exactly; the somewhat irregular spacing of them in the carving may perhaps be put down to bad draughtsmanship. The over-all length of the carving is rather more than that of the design; but as the ends of the original carving are now missing and the lines shown are merely conjectural, this discrepancy becomes a matter of no moment.

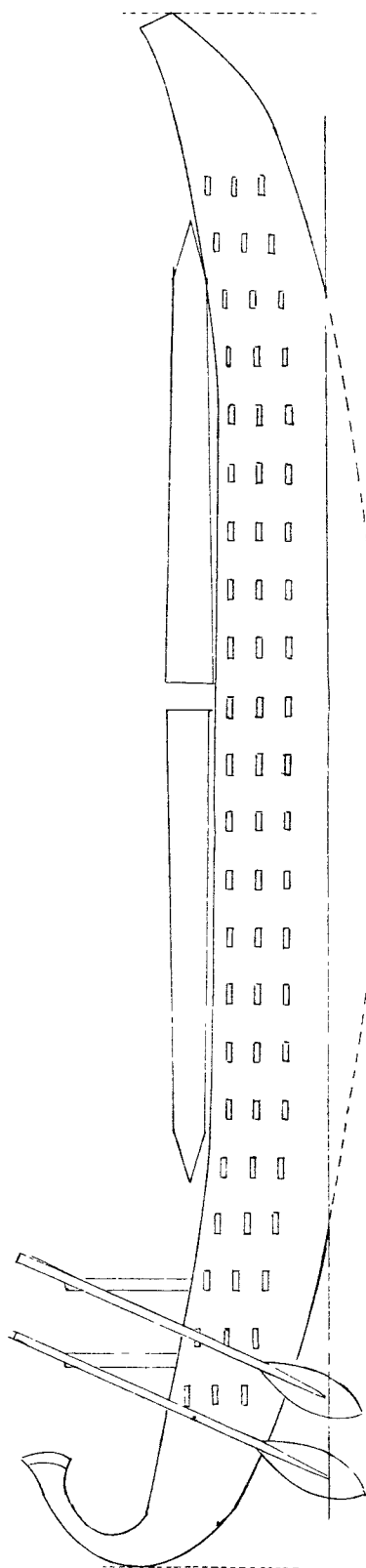


FIG. 3.—OBELISK BARGE AS CONSTRUCTED ACCORDING TO RULES FOR SHIP-BUILDING DEDUCED FROM XIIth DYNASTY FUNERARY BARGE.

This remarkable agreement between the lighter as designed and the carving proves two things. First, that in essential details the carving is to scale, which measurement shows to be  $\frac{1}{3}\frac{1}{5}$ , or 1 palm equals 5 cubits. The only error in the carving lies in the size of the side of the obelisks; it is probable that Senmut gave the sculptor the main measurements of his barge and the lengths of the obelisks, but omitted to state the size of the side. The other fact that emerges is that the rules for design evolve a ship similar in every way to that built by Senmut.

Two apparent errors may be seen. The position of the rudders in the design does not agree with that shown in the Deir el-Bahri carving. Actually, the carving shows four rudders, and the pair on one side appear in fig. 3A. If, however, the pair on the other side had been shown instead, the rudders as placed in the design would have agreed with the carving. This apparent error is due solely to the Egyptian custom of showing things which are side by side as one before the other.

The placing of the obelisks in the design is about 10 feet ahead of those in the carving. This was necessary to make the designed vessel trim correctly to the water-line as calculated; but this discrepancy does not affect the fact that the rules for ship design derived from the funerary barge of the XIIth dynasty do produce the type of ship that was built in ancient Egypt.

Since the Deir el-Bahri carving of the obelisk lighter is true to scale, it may safely be assumed that the ships of the Punt expedition are also to scale; in this case  $\frac{1}{14}$ , or 1 palm equals 2 cubits.

The obelisk lighter of Queen Hatsepshut was probably the largest ship of the ancient Egyptian type that was ever actually built. It was not, however, the largest that was contemplated. The unfinished obelisk at Assouan as originally lined out would have weighed over 1,000 tons; and it is unlikely that it would have been started unless the contractor had anticipated that he could transport the finished article down the river. For this a lighter of about 2,000 tons loaded displacement would have had to be built.

Various suggestions have been made concerning this obelisk lighter. One, that it was a wooden box built round the obelisks, must be rejected on the ground that it would have required a framed structure, an idea quite foreign to ancient Egyptian ideas of shipbuilding. Another suggestion is that the lighter was really a solid raft. The timber available in Egypt suitable for the construction of a solid raft would have weighed about 40 lbs. per cubic foot, that is, rather more than half the weight of water. When the upper surface was level with the water, it could have carried a load of 22 lbs. for each cubic foot. In other words, to carry a 700-ton load at least 1,400 tons of timber would be necessary, just about double the amount needed for a ship of normal type.

It may, therefore, safely be assumed that the Deir el-Bahri carving of the obelisk barge of Hatshepsut was an eye-witness's representation of the actual lighter.

C. D. JARRETT BELL, R.C.N.C. (retd.).

## THE GOD 'ASH.

OWING to the early use of writing in Egypt it is possible to obtain some knowledge of the civilisation of other countries at a period when those countries had no written records of their own. This is more especially the case in regard to religion, and perhaps the most marked example is the god 'Ash. He occurs only five times in the whole course of Egyptian records, and the rarity of the occurrences would in itself suggest that he was a foreign deity, but other proofs are also available.

On sealings of the II<sup>nd</sup> dynasty (Fig. 1) 'Ash is represented as a human figure with the head of the fabulous animal of Seth, and wearing the crown of Upper Egypt. The sealings are from the royal tombs at Abydos (Petrie, *Royal Tombs*, II, pls. xxii, 178, 179 ; xxiii, 199, 200) and Naqada (de Morgan, *Tombeau Royal*, figs. 816, 819), the names of the Kings being Perabsen and Kha-sekhemui, in whose titularies the figure of Seth always occurs. On each of these sealings 'Ash is associated with a royal vineyard, suggesting a fertility connotation.

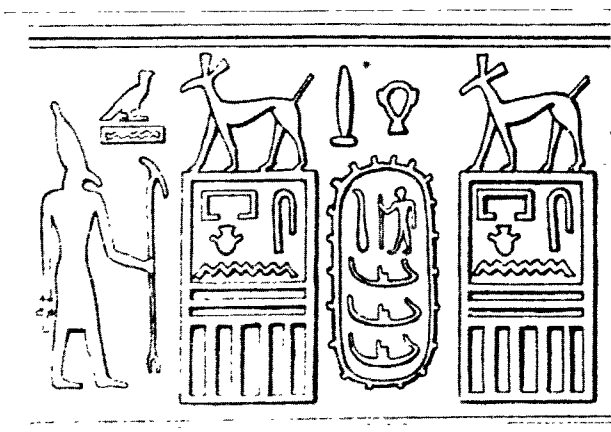


FIG. 1.



FIG. 2.

The god occurs again in the V<sup>th</sup> dynasty (Fig. 2) on a sculptured slab of Sahure' which shows the spoils taken by the Pharaoh in his Libyan campaign (Borchardt, *Sahure'*, p. 17, Abb. 11). 'Ash is here depicted in human form with no special attributes, and is called *nb Thnnw*, "Lord of Libya". With him is the goddess of the West, and from their position with regard to the booty it seems that the two deities are presenting it to the victorious raider. As *Thnnw* can also mean olive-trees there is again a fertility connotation.

In the Pyramid Texts of Pepy (Fig. 3) there is a spell referring to 'Ash, but though the sentences can be translated, the meaning is obscure, probably because of our ignorance of the allusions. "His words are heard by the Ennead of the Gods. Neither his possessions nor the possessions of his house belong to 'Ash, who devours his body."

There is, as far as I know, no mention of 'Ash in the Middle Kingdom, but

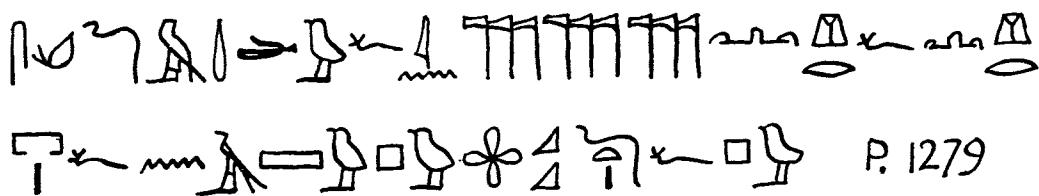


FIG. 3.

in the XVIIIth dynasty he occurs in the Book of the Dead (Fig. 4) in what appears to be a rain-making spell. "I am the Terrible One in the thunder-storm. . . . I am refreshed by this 'Ashu. I have acted for the Great One in the battle. I have established the flint-knife among the flint-knives which are in the hand of Thoth in the thunder-storm." The allusion to flint-knives in thunder-storms is peculiar, having regard to the belief in "thunder-stones" in Europe. In three out of the four occurrences of his name, 'Ash is evidently a god of the fertility of the earth; in the IIInd dynasty he is associated with vineyards, in the Vth dynasty with olive-trees, in the XVIIIth with rain.

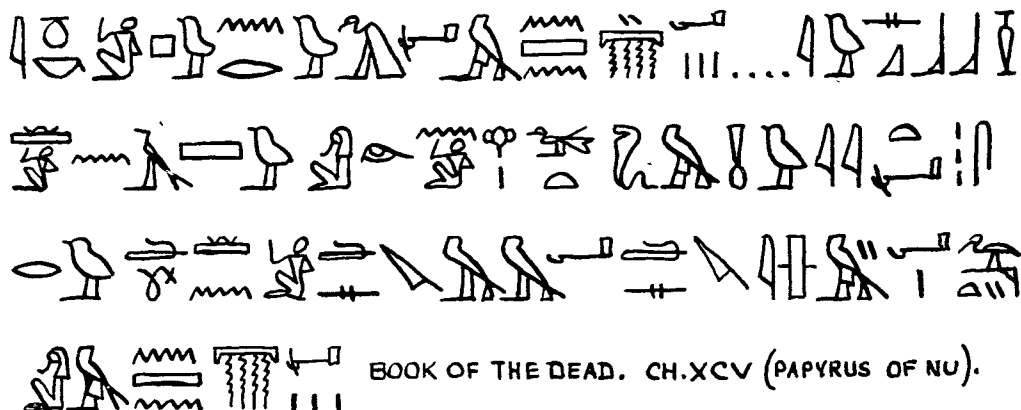


FIG. 4.

The latest reference to 'Ash in Egypt (Fig. 5) is on a coffin of the XXVIth dynasty, now in the Brighton Museum, and published by Mr. Alan Shorter in the *Journal of Egyptian Archaeology*, vol. xi (1925), p. 78. The god is represented in the conventional artistic style of the period, but with certain peculiarities. He has three heads, a lion, a vulture and a snake, the last being bearded and wearing the crown of Upper Egypt. Multiple-headed gods are always rare in Egypt and are, I think, foreign deities and not indigenous. The snake is interesting for it appears to be the hoodless cobra, which is well-known in northern Egypt and is as deadly as the hooded variety. Other peculiarities of this figure of 'Ash are that he wears no tail as was usual in representations of gods after the XVIIIth dynasty; he also has an unexplained band across the chest and he carries a snake head downwards in his hand. His name is given as "'Ash of many faces in the midst of Maz" [the place-name may possibly read Diz]. The other inscriptions on the coffin are the usual prayers to Osiris for the dead and contain no further reference to 'Ash, nor are the other deities on the coffin in any way uncommon.

The latest recognisable representation of 'Ash was published in 1545 by Sebastian Münster in his *Cosmographia Universalis*. In this Münster gives an account of Marcomir, the first king of the Franks, an entirely legendary character.



FIG. 5.



FIG. 6.

Marcomir, who was of Trojan descent, reigned in Scythia, but being unable to withstand the invasions of the Goths he decided to seek his fortune elsewhere and to lead his followers to another country, though to which land he could not determine. He therefore consulted a witch (*ein zauberin oder hex*), named Alruna, who by her magic and sorcery caused a demon (*Abgott*) with three heads to appear by night to the king. The figure of this demon (Fig. 6) as depicted by the 16th century artist bears so remarkable a resemblance to the representation of the god 'Ash in the XXVIth dynasty that the likeness cannot be accidental. The differences are only in the style of art of each period, but in both there are the heads of the same three creatures, in both there is the same band across the chest marking the edge of the ritual mask, and both wear a loin-cloth. This last point is interesting, for a European demon in a loin-cloth is unique in the annals of witchcraft. The German author calls the snake a toad, but the neck of the creature shows that it is certainly a snake. He also calls the bird an eagle, but this again is clearly wrong for the bird is a vulture, and the artist has even indicated the thin feathers on the neck so characteristic of the Egyptian vulture. Münster unfortunately has not recorded the name of Alruna's demon; his identification with the god 'Ash rests therefore on the close resemblance between the two figures.

That such a deity should survive in the less frequented countries is not surprising. In Egypt the cult of, and belief in, the indigenous deities died with the introduction of Christianity, but 'Ash was not Egyptian, he belonged to a northern, perhaps to a western, people. He had therefore a longer term of recorded life than any other god, beginning in the IIInd dynasty and lasting till the middle of the 16th century of our era.

M. A. MURRAY.

## REVIEWS.

*Teleilat Ghassul*. By A. MALLON, R. KOEPPPEL, R. NEUVILLE. 4to., pp. 193, 72 pls., 66 figs. 1934. (Rome, Piazza della pilotea 35.) Frs. 140.

This is a worthy record of discoveries in the Dead Sea plain, which had not yet been explored, and it proves a considerable civilisation to have existed there at an early period. There was at first a talk of these sites being the Cities of the Plain, *i.e.*, of the age of Abram, 1800 B.C.; and this age still seems to be favoured as the changes during 4000 years are named, pp. 25-6.

It is unfortunate that the writers have not compared the results with those published three or four years ago from the prehistoric sites near Tell Fara in the Wady Ghazzeh (*Bethpelet II*). In that valley a series of Neolithic sites were found, ranging from the period of the triangular hoe to the straight hoe, and closed by a site of the earliest Copper age. In this series, about half way, there was an intrusive people found, who did not drive out the aborigines, but disappeared after a generation or two. That they came from the Jordan valley was inferred from their introduction of basalt vessels. Their period was middle Neolithic.

Now it appears that this was all one with the civilisation of Teleilat Ghassul, and so dates that. The flint points, fan-shaped large flakes, square-ended hoes, millstones, maces, bone points, bodkins, stone beads, flat figures with stump arms, pottery dogs, bowl patterns, matting, finger prints on ledge handles, flat-based jars, pottery spoons, conical silos, basalt bowls on stands, long conic pots, red line painting, and rectangular houses—all this apparatus of civilisation was alike in both places. Teleilat Ghassul lasted rather later, having coarsely cast bronze hoes in the topmost stratum. The age of this Jordan civilisation is therefore long before the Ist dynasty, probably well before 4000 B.C., from middle Neolithic to early metal.

It is then, to our readers, mostly of interest where it exceeds the range of the products already familiar to us in the Wady Ghazzeh. The bronze tools of the latest level seem to have been roughly cast in moulds; they have 7 per cent. of tin, which was not in use in Egypt till much later. The calyx-shaped bowls on tall pedestals are peculiar; they belong to the latest levels.

The paintings on the walls are quite unknown elsewhere, and are astonishing. There only remain the lower legs and feet of figures, a black form approaching three red seated figures having feet raised on stools; a scene of worship of the gods or ancestors. Another chamber has some ghastly black heads with white eyes, called "birds," but enigmatical. Yet another chamber has a great star device with eight rays, alternate red and black. In the centre an eight-pointed star, and yet another in that. Various scraps of figures are scattered around, but indistinct. There is at least a small boat with fore mast and red sail, and two other possible boats, white on black, and red. A slim red figure with black outline holds out a black conical object. There is also an animal with large ribbed horns. The whole needs study of the original with some familiarity with the Hierakonpolis tomb and other mural paintings.

Such a fully illustrated account, having due regard to the four successive strata of the site, is very welcome, and will long serve as a source-book for comparison with other discoveries.

F. P.

*La Technique des Fouilles Archéologiques.* By Comte DU MESNIL DU BUISSON. 8vo., pp. 256, 7 pls. 1934. (Geuthner, 13 rue Jacob, Paris, VI°). Frs. 60.

Every excavator should read this detailed and comprehensive guide, and judge how far his own practice might be improved by it. In the first place it is strictly logical to begin with the outline of the three years' course of training at the École du Louvre: but the logical order of any subject is seldom the most effective in teaching. It is usually best to learn by practice under an effective master. The École may teach (*a*) the principles, (*b*) work on cemeteries, (*c*) work on towns, but it does not seem to teach the training of workmen, which is the most essential means of success. Happily the Count is too good a humorist to neglect that, and he is emphatic on friendly relations with all nations, the stimulus which *bakhshish* gives to observation and care, and the collection of information and objects from all quarters that lie within reach. The devotion of the men to the work, and their good faith, is to be cultivated by profit-sharing in good fortune. There should be no confiscation, and the State should prove itself to be a good purchaser and honest.

There is, however, a fly in the ointment when he recommends that the village *omdah* or sheykh should be consulted about wage rates, that the *reis* should call up and name the men on pay day, and that men may be made up into gangs of ten to be easier to reckon with. All that means the lack of personal knowledge about each worker, and the interference by the means of corruption between master and man. Any *omdah* in Egypt would name the highest wage rate in order to levy part from the men afterwards: any *reis* would expect to exact something as a go-between: and no man feels his duty personal unless he is known by his own name, and not in a collective group. We used to distinguish in the dark the foot-fall of many of the men. The special quality of each man should be observed, that his work may be fitted to him. One will excel in tracing walls, another in pioneer hunting, or in heavy uniform slogging, or in minute detail, or in delicate clearing of a grave without shifting a single object. Certainly the most effective work is obtained by fitting it to the man who does it by instinct.

The light railway system for shifting earth is naturally to the fore; but for short distances the use of children to carry baskets is recognised, and there is the advantage of a second search of the earth as it is showered from the baskets. For discoveries a successful child should get a full reward, and the digger be told what he has missed—a potent stimulus to attention. The daily amount of earths of various solidity that is moved agrees well with experience in Egypt. The general directions about observation and method are what have also been reached by other excavators.

It may be useful to state other methods of work which the Count does not seem to notice. In survey over a field of work it is best to set up lines of poles at, say, 50 metres or 2,000 ins. apart, forming a regular squared grid of lines. Then it is only needful to take measures from any point to any two of the crossing lines to fix the place, and it can be rapidly plotted on squared paper. On small areas, and in the interior of tombs or graves, the method is to peg two strings at right angles, and then plot off on squared paper the distance from any point to each string; the plan is finished as it proceeds, and any discrepancy is seen at once. The level should be written at top and ground on survey poles, and on a key plan. For any object to be levelled, plant a measure on it and read off to any levelled pole against the sea or some distant horizon.

The pot of melted paraffin wax, and primus stove, is essential for preserving



any delicate object, especially skulls, and should be in daily use for such things. Salt or saltpetre should never be removed by soaking, but by laying the sculpture on, or in, damp sand, leaving the rough face exposed to drying. A crop of salt will come out every day, to be brushed off, so long as any remains in the stone, and the face is perfectly uninjured.

In photography use a stop of F/100, and it is needless to be careful about focussing.\* Never use hyposulphite, but leave the developed film to dry after a wash: it will not spoil in sunlight, and the clearing and washing can all be done by the printer. In copying inscriptions, turn back each line as copied, so as always to place the fresh paper immediately below the original subject; this gives more accuracy and makes omissions impossible.

Dry squeezing on paper is not only for black-ball copies, but also to provide an accurate outline for hand-drawing.

The great use of reference-slips for classifying information leads to too much paper work. It is generally best to make all notes of place or nature on the pencil drawing of each object; ink in only what is for the plates, and use the pencil notes in writing up the text of plates. For notes about ground or structures, write on the field plans; from these the selection is made for permanent notes on the unified plan published. *Fiche* devotion becomes an end in itself. Use squared paper, in light blue lines, for all plans and drawings; 4 mm. or 1/10 inch is close enough for plans, and double this distance for objects. Every note that is unnecessary is a mere obstruction.

For tomb registers it is best to have cards, with printed title for every observation that should be made; usually sketch plans are put on the back of the card. Such cards are the size of a usual envelope, and stiff to keep flat in the pocket; two or more can be used for complex cases.

For registration of the objects from a town, use three letters (region, house, and chamber) and level; also the type in a *corpus* of types—this *corpus* extends to 5,500 figures for Palestine already.

In the preparation of the final account it seems best to give first a statement of all the dating points, and to discuss the periods completely. Then the reader feels assured of the historic values in following the descriptive account. As far as possible have each plate self-explained, with notes, and lettering on detail in views, so as to save reference to text. Every plate should have at the top the scale, locality, and nature of objects, as such plates are often wanted loose for classification by subject.

Every excavator will have his own methods, varying by inclination and place, but each should at least know how others work in order to select the best available course.

F. P.

*Ancient Oriental Seals of E. T. Newell.* By VON DER OSTEN. 4to., pp. 204, 41 pls. 1934. (University of Chicago; Cambridge University Press.) 27s.

This is far more than a catalogue, for it comprises a classification and discussion of all the types of Oriental seals. A shaded diagram happily shows the range of period and of country of each large class. The catalogue fully describes the subject of each of the 695 cylinder seals, with cold impartiality; a more personal appreciation and linked discussion of the subjects would have been a welcome addition. There follows a discussion of each type of God

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\* Use only F 100 in sunshine, F 22 for skylight, F 8 for interior, then the suitable length of exposure can more readily be estimated.

according to local groups, also of the Priests, Animals, Dress, Flowers, Emblems, Mountains, Buildings, Chariots, Altars, Furniture, Standards, and Ornaments. Then comes a description of Scenes. All inscriptions are transcribed and translated. A long bibliography states all work connected with the subject. There is an index of every mention of each seal. The collotype plates show all the seals well and clearly. It would be hard to render a more complete account of any detail of the subject, and it will be a text-book for students. F. P.

*Nan-Shan-Li. Brick Tombs of the Han Dynasty near Port Arthur.* English text by KOSAKU HAMADA. 4to., pp. 40, 53 pls. References to many figures in 115 pp. Japanese text. (Far Eastern Architectural Society.)

These tombs range from the 1st century B.C. to the IIIrd century A.D. The dated bricks are from 40 to 404 A.D. The most striking objects are the house models in pottery; they are only of a single chamber, and therefore are soul-houses giving a shelter, but without the domestic details of such soul-houses in Egypt; there are separate models of cooking stoves and pots. The chambers of the tombs have round arched roofs with two rows of voussoirs. There are various patterns in relief on bricks to serve for ornamental bands. Some lacquer-work cases remain, and the iron tools are of Asiatic forms. This volume is another of the splendidly illustrated and complete accounts which are the mark of Japanese archaeology. F. P.

*Iraq Excavations. Third Report, 1932-3.* By HENRI FRANKFORT. Svo., pp. 92, 83 figs. 1934. University of Chicago.

This is mainly occupied by Tell Asmar work, which examined five strata, reaching back to the age of the great tombs of Ur. Houses of that period are here planned, with the later Akkadian continuation; these were at first an open court with four or five rooms round, and later seven or eight rooms. The doorways were arched. The earlier pottery is very ugly; in Sargonid times it was little better, and clumsy pilgrim bottles had begun. The alabaster head of an Akkadian is harsh and heavy-featured. The Akkadian palace had 36 rooms and a central court. There were many bathrooms and latrines joining a sewer which ran below the front of the palace. The main motive in the jewellery is a disc with pierced radiations. Amulets have a lion head or bull head. A hoard of copper work includes the shell-shaped lamp of Ur, a strainer with long handle, and a copper tube. The last explains what the tubes were, from which seated figures are drinking; a seal impress shows comic figures of a lion and a donkey seated upright sucking at tubes. The copper tube is curved, 28 inches long with perforations at one end; these suggest that it was used for drinking muddy beer. The Tell Halaf sculptures are accepted as dating about 1500 B.C.

A small temple, a single chamber, long and narrow, belonged to Abu, the god of vegetation. In it were square plaques of limestone with groups of adoration; the central hole so usual in these plaques is considered to have served to peg them to a wall.

Part of a cylinder of clear blue glass was found, dating to 2600 or 2700 B.C. The bronze tools had  $7\frac{1}{2}$  per cent. of tin. Iron was used for tools before 2700 B.C.; it is certified as such by Prof. Desch, who states that it is not meteoric iron.

The town of Khafaje has been further worked outside the fortified ring of enclosure. The simple gate in the ring had been covered by a larger recessed gate in later times. The buildings extend from the Jemdet Nasr period to

Sargon. At Khorsabad a temple of Nabu has been excavated, with a stone pavement and walls still fifteen feet high.

At Jerwan a long aqueduct of large blocks of stone has been traced, bringing water some thirty miles from the hills to irrigate Nineveh. It was built by Sennacherib, and bridged a ravine 900 ft. wide. F. P.

*Egypt and Negro Africa.* By C. G. SELIGMAN. The Frazer Lecture for 1933. Pp. 82, 2 pls., and a map. (Routledge, London.) 3s. 6d.

This book has for its main thesis the belief and customs concerning Divine Kings in Africa; the secondary theme is "to show that Egyptian influence did in fact penetrate to the very heart of Negro Africa." Professor Seligman, however, points out that many customs and beliefs held in common by Ancient Egypt and Modern Africa are merely indications of "the wide diffusion of old Hamitic blood and ideas." This is an important point, for to the mere Egyptologist it appears odd, to say the least, that so much "Egyptian" influence should have survived the continuous change of population, by conquest and immigration, which has taken place in Africa during the last two thousand years. The northward drift of culture has not been seriously considered; yet it is surely possible that when the Ethiopian king, Tirhaka, performed the ceremony of shooting arrows during the *Sed*-festival, he had brought that ceremony from the south. Even the other examples of arrow-shooting during an ancient Egyptian royal ceremony were performed under the auspices of the god of the south. Apart from these doubtful points the book is not only well worth reading but well worth keeping for reference, for the author has collected into a small space practically all the information as to Divine Kings in Africa. Appendix 2 is peculiarly interesting as showing methods of desert travel in pre-camel times, when donkeys were the only means of transport. M. A. M.

*Ancient Gaza, IV.* By FLINDERS PETRIE, F.R.S., F.B.A. Pp. 21, pls. 70. 1934. (Bernard Quaritch.) 40s.

Sir Flinders Petrie sets an example to all excavators in the rapidity of publication of his excavations; any knowledge obtained is thus at once available for other workers. The new volume, *Gaza, IV*, continues the story of the excavations at Tell Ajjul. Among the most important finds are the scarabs, of which more than five hundred were discovered. As might be expected, most of these were Canaanite imitations of Egyptian work, generally of the New Kingdom; but the actual Egyptian scarabs take the date of the site back to the XIIth dynasty with the name of Amenemhat III. The most interesting as well as the most spectacular objects were three hoards of precious metals, probably jewellers' or dealers' hoards for re-melting and re-using. The granular goldwork is specially worth noting, for it is known in Egypt as a foreign importation in the XIIth dynasty, and at Gaza it is also foreign. The original home of this highly skilled method of gold-working is still to seek. The necklets and ear-rings of twisted strips of gold are so closely related in type to Irish prehistoric torques that a connection between the two countries is indicated, though whether that connection was direct or indirect cannot yet be determined. The units of weight of the gold objects found in graves and hoards during the last four years of excavation are extremely important, and taken in connection with actual weights found on the site show a wide range of contact, indicating the amount of foreign trade. In his concluding remarks Sir Flinders Petrie points out that "at Gaza the more advanced works of a higher civilisation were

imported from foreign lands which lay north. This unknown civilisation is now one of the problems of the Near East." It is this problem which Sir Flinders has set himself to solve. M. A. M.

*Measures and Weights.* By Sir FLINDERS PETRIE. Pp. x, 22. (Methuen and Co., Ltd.) 2s.

This book for those engaged in practical work epitomises very clearly the present state of knowledge of a fascinating though hitherto curiously neglected subject. In his preface the author censures the wilful neglect of excavators who "often find stones (weights) like that" and disregard them, thus "throwing history away all the time." They lose sight of the evidence of great movements of people, of ancient international relations, in fixing their attention upon objects more beautiful in themselves but often of little more than local importance.

This book should have a much wider appeal than merely to the metrologist. Here is matter to interest the "man in the street," that is eminently readable and full of interest. Figures there are, of course, but only the essentials, and not in such masses as to be indigestible. Weighing and measuring are the basis of all scientific and commercial enterprise, and at any period reflect accurately the state of civilisation of a people.

Here is summed up for us what is known of the history and evolution of the ancient weights and measures, mass, linear and capacity, what can be said for certain of the descent of some modern measures from them, and what still remains to be done.

For the practical metrologist, there is no wild theorising on scanty material, but the results of nearly half-a-century's work in building up the magnificent collection at University College, London, and collating the evidence of it and other large collections.

One word of warning; before examining the graphs on page 14, first read the author's note on how to read them (page 13)! Otherwise you will almost certainly miss the point, for they are not as other graphs. Yet, a little reflection will convince you that in no other way could the information be conveyed so concisely.

T. G. SKINNER

*Zur Indus-Schrift.* By P. MERIGGI. Pp. 44. 1934. (Reprinted from *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, vol. XII, parts 3-4.)

This is a very clearly written article. In it the writer submits his main results for criticism, pending a longer work which cannot be printed at present. He claims that even sceptics must admit that he has put forward a coherent system of meanings which are confirmed, or at least not refuted, by any fresh evidence which is at all intelligible; further, that the system itself cannot be wholly wrong even though certain meanings which are not dependent upon others may be so.

The seals are referred to by Arabic numerals preceded by "No." (or by H. for those found at Harappa); the tablets by Roman numerals. In general the signs are rendered by Arabic figures in italics, from Gadd and Smith's *Sign Manual* (pls. CXIX-CXXIX), but those of most frequent occurrence are transcribed differently, in that letters somewhat resembling the signs are used for the commonest, particularly for phonetic signs (e.g., A for 159, U for 238), whilst others, particularly ideograms, are represented by the object they depict or its initial letters. The variants are shown by diacritic strokes. The texts are reproduced from left to right; that is, they reproduce the seals, not the impressions.

The writer's main results may be summarised as follows :—

The single sign ' and the double sign " are word-dividers and they are interchangeable.

Certain enclosing signs, particularly four small strokes arranged thus '...', serve to emphasise certain ideograms or to surround certain signs which are generally used phonetically.

The most usual noun endings (given as A, U, Y (Ψ)—for Y, see p. 204, note 1) are case-endings (nominative, genitive and perhaps dative respectively).

The following word-signs are to be read thus :—

73-79 Stamp-mark (German Sté for Stémpel), with which the writer identifies variants 65-6 (German Ste), 114-16, 118, 120-22 (German Stê) and 147-8 (German Sté), is of peculiar interest on account of its frequent occurrence and of the light it throws on the texts; 227-8 Mortar "corn" (German Mö for Mörser); 386 Load (Last); 387-8 <sup>4</sup>Load "four-fold load" (German <sup>4</sup>Last); 93a-96 Horse (Pf for Pferd); 163-67 Hoe (Hacke); 220, 223-4, 320 Scythe "the harvest, to reap" (Sense), thus 394 "reaper" and 392 "miller"; 67-71 Grain (Getr for Getreide); 263 Seed (Same); 89-92 Pulse (Hüls for Hülsen); 293-95 and 253 Storehouse (Lag for Lager); 304-07 House (Haus); 308-9 Temple (Temp for Tempel); 322 Table (Tisch); 370, 372 Man (M for Mann); 378 Archer or Soldier (Bs for Bogenschutze); 377 Overseer (Aufs for Aufseher); 395-6 Officer (Off for Offizier). L. B. E.

*The Monasteries of the Wadi 'n Natrûn: Part II. The History of the Monasteries of Nitria and of Scetis.* 1932. Part III. *The Architecture and Archaeology.* 1933. By HUGH G. EVELYN WHITE. Edited by WALTER HAUSER. Metropolitan Museum of Art: New York. \$15 in paper; \$17.50 in boards.

The publication of these magnificent and beautifully illustrated volumes was made possible by the generosity of Mr. Edward Harkness. The very full MSS. left by Evelyn White at his untimely death have been most ably edited by Mr. Hauser. They constitute a remarkably complete account of a remote and interesting group of monasteries, to whose foundation is due the establishment of monasticism as a Christian institution. Their history is traced from the early fourth century down to the nineteenth with an astonishing wealth of anecdote and informative detail. In Part III, the ninety-three plates of plans and photographs are of great architectural and artistic interest. D. M.

The reviews of several important books have unfortunately to be held over owing to pressure on space. They include :—

*Palaeolithic Man and the Nile Valley in Nubia and Upper Egypt.* K. S. SANDFORD and W. J. ARKELL. 1933. (Orient. Inst. Publications. Univ. of Chicago Press and Camb. Univ. Press.) 28s. 6d.

*Chalcolithic and Early Bronze Age Pottery of Megiddo.* R. M. ENGBERG and G. M. SHIPTON. 1934. (Univ. of Chicago Press.) 7s.

*The Bucheum.* Sir ROBERT MOND and O. H. MYERS. 1934. (Oxford Univ. Press.) 42s.

*Ancient Egyptian Materials and Industries.* A. LUCAS. 1934. (E. Arnold and Co., London.) 16s.

## JOURNALS

BERYTHUS, I. 1934. Large 8vo., pp. 46, pls. 12. American Press, Beirut. Frs. 20.

We must welcome here a new archaeological annual, which may well grow in future.

SEYRIG, H.—*Invidiae Medici*.—This is a study of Gnostic amulets representing the ibis and serpent ; these link on with the *euepti* amulets. Another class has to do with St. Sisinnius and the protection of children. On a third kind is the figure of the reaper of tall corn, best figured in my *Amulets*, with the serpent of eternity around. The example here is inscribed *skhiōn*, perhaps as an amulet for reapers.

DEBEVOISE, N. C.—*Parthian and Sassanian Glyptic Art* deals with the various types of coarsely cut seal-stones of the Hellenistic period. Busts and animal figures are the most usual subjects.

NELSON, H. H.—*Egyptian Stone Vases from Byblos*.—These pieces of inscribed alabaster doubtless came from Pepy's temple. They were bought about ten years ago. The royal names are Ra · ded · ka, Tetu III, Pepy I, and Pepy II ; and these pieces, some two dozen in number, show how richly the kings adorned the temple at the Sed Heb festivals.

CLAWSON, D.—*Phoenician Dental Art* describes how four loose front teeth were all lashed round with gold wire to retain them between two others in the lower jaw. This specimen from Sidon is compared with the more skilful Etruscan work, where gold bands, soldered together, clasped four molars and so secured four other replaced teeth.

INGHOLT, H.—*Palmyrene Sculptures in Beirut*.—An interesting series of seven inscribed busts is illustrated here. The period is from about A.D. 50 to 240. The cylindrical head-dress, sometimes wreathed, is shown to be that of a priest by its appearance on tesserae with the title "priest of Bel."

CHÉHAB, M.—*Trois stèles trouvées en Phénicie*.—One stele has a cornice of Uraei, under which are a globe and uraei. In the panel are two pillars, each crowned with a row of four uraei. A second stele has a male figure with right hand raised, beneath a winged globe. The third bears a tall bearded figure draped in Persian fashion, with right hand raised, adoring a globe on a crescent, the sun and moon or the full and crescent moon. Over the figure is a disc with one wing stretched over the worshipper ; there is a row of rosettes above. F. P.

JOURNAL OF THE AMERICAN ORIENTAL SOCIETY. LIV. 169.

BERGMAN, A.—*Israelite Occupation of Eastern Palestine*.—This study is based on the territorial history, using the factors of geography and climate as controlling the historical changes. To the north, near the sources of the Jordan, are many early Bronze Age *tells*, and also in the Hauran. Egyptian steles of 1300 B.C. are found there ; and many towns named in the Amarna letters and inscriptions, especially in Bashan on the Yarmak. Between that and the Jabbok, in Gilead, there was very little occupation. Further south, in Moab, there was early settlement ; and beyond, in eastern Edom, there was also the attraction of copper mines. It appears that the Israelites first entered the less occupied regions, before attempting to conquer the cities. The regions of Gad and the half-tribe of Manasseh are correspondingly traced. There is a lack of the

historical unity in the accounts of this region, which are much less definite than in the history of Western Palestine. F. P.

QUARTERLY OF DEPT. OF ANTIQUITIES, PALESTINE; IV, 1 and 2. 1934 (London: Milford.) 5s. quarterly; 18s. 6d. for four parts.

R. W. HAMILTON.—*Excavations at Tell Abu Hawām*.—A well presented account of the excavation of a fortified settlement in the Kishon valley, with plans and thirty-nine plates. Four main periods of construction are shown, from the latter part of the Late Bronze Age to the Graeco-Persian period (late VIth to early IVth century B.C.). The crises in the history of this settlement indicated by the dismantling of walls and by conflagrations appear to coincide with the invasions of Rameses II, Merneptah, Rameses III and Shishak I (c. 926 B.C.). After its destruction by Shishak, the site seems to have been deserted for several centuries. It was reoccupied for a comparatively short period in Graeco-Persian times, but it was of little importance and seems to have been finally superseded by Haifa.

J. H. ILIFFE.—*Cemeteries and a " Monastery " at the Y.M.C.A., Jerusalem*.—An account of ancient tombs and part of a building of V-VIIth century date excavated at the clearance of a sports ground for the Y.M.C.A. An inscription which probably dates from the first half of the VIth century A.D. mentions the Bishop of the Georgians and the Tower of David. D. M.

SYRIA; XV, 2. 1934. (Paris: Paul Geuthner.) 150 frs.

C. F. A. SCHAEFFER.—*Les Fouilles de Ras-Shamra, Cinquième Campagne (Printemps 1933)*.—Excavations made at the foot of the *tell* to clear a space for dumping revealed several tombs which had been robbed anciently. The types of pottery found in the third stratum examined suggest a common ancestry with the painted wares of Iran and Mesopotamia. In further excavations north, south and west of the Temple and Library there were found several interesting inscriptions, tombs of the XIIIth century B.C., and remains of the Egyptian Middle Kingdom. Further evidence was forthcoming for the identification of Ras-Shamra with Ugarit of the Tell el-Amarna documents; local folklore also localises at Ras-Shamra the ancient capital of the country. Though the site has been searched for treasure as far back as Greek and Roman times—and by the Turks more recently—a remarkably fine gold cup and dish were unearthed that were evidently part of a hastily buried *cache*. They had probably belonged to the Temple and are dated by their style to the first rather than the second half of the XIVth century B.C. They are evidently of Syrian or Phoenician workmanship. Notes on inscriptions are by Montet, Virolleaud and Thureau-Dangin.

M. HENRI SEYRIG.—*Bas-reliefs monumentaux du temple de Bél à Palmyre*.—These reliefs—the oldest in Palmyra—date from the building of the Temple of Baal which was dedicated in 32 A.D. They picture gods and a goddess, priests making offerings, a sanctuary, and monsters whose extremities were serpents or those of fish. A certain Graeco-Roman influence is evident, but the sculpture is entirely oriental in its flatness, the lowness of the relief, and the lack of perspective and of composition. Its most interesting feature is the full-faced mode of portraying the human figure, which no doubt was learned from the Parthians, who were close neighbours of the region where developed the Graeco-Buddhist art of which this was characteristic. Through Palmyra, it appears, the full-faced mode of portraiture was passed on to the West. D. M.

## NOTES AND NEWS.

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At University College, London, on November 23rd, Colonel Sir Henry Lyons, F.R.S., on behalf of the subscribers, presented to the College a portrait of Sir Flinders Petrie in commemoration of his forty years' tenure of the Edwards Chair of Egyptology—the first Chair of Egyptology to be founded within the British Empire. This fine portrait was painted by Mr. Philip de Laszlo. A sufficient sum had been subscribed to include also a cheque that has been presented to Sir Flinders Petrie himself, to be devoted to whatever aspect of his work he may wish.

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Despite his long and magnificent record of archaeological work in the Near East, Sir Flinders Petrie has this season undertaken a new search for the origins of the advanced civilisation which he has studied in recent years in Southern Palestine. Convinced that this civilisation came from the north, Sir Flinders Petrie, by courtesy of the French authorities in Syria, is now making a survey of northern Syria with a view to finding sites the excavation of which would be likely to throw light on the problem. It is to be hoped that the subscriptions this year to the British School of Archaeology in Egypt will be as generous as ever, despite the change of field that has in recent years removed the work of the school from within the confines of Egypt.

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At the same time, the British School of Archaeology in Iraq is similarly widening its field of research beyond the frontiers of that country. Unhappily this is not only at the demand of scientific inquiry, for the fear that unacceptable conditions are to be imposed by the Iraqi authorities on archaeological research seem once more in danger of being justified. Mr. Mallowan is now engaged upon a survey of the east bank of the river Khabur to find evidence of the connections of Syria with Assyria and Babylonia which may be expected from the recent great discoveries in Mesopotamia.

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While the links connecting Egypt and Southern Palestine on the one hand and Babylonia and Assyria on the other with Syria are thus being sought out, the contacts between the Indus valley civilisation and Sumer and Iran are also to be studied. It is announced in the *Journal of the American Oriental Society* (September, 1934) that the recently organised American School of Indic and Iranian Studies "will co-operate with the Museum of Fine Arts of Boston in a joint excavation of a site in the Indus Valley as soon as a concession has been secured from the proper authorities in England and in India." The great importance of this latter field of investigation is apparent from the growing evidence of a lively trade between the countries. Seals and other objects of Indian origin have been found in considerable numbers in the Sumerian cities, and articles of foreign origin at Mohenjo-daro. The remarkable explorations of Sir Aurel Stein in Baluchistan and Persia have also revealed ancient remains of contemporary date, the further excavation of which should prove most fruitful in results.



Since the last number of this journal went to press, the British School of Archaeology in Iraq has produced the first two numbers of its fine journal *Iraq*, which is cordially welcomed by all who have the interests of archaeology at heart. The publication of the valuable discoveries of trained field-workers in the East cannot be carried forward too rapidly.

## OBITUARY.

### KURT SETHE.

English Egyptology has suffered many losses during the course of this year, and now it is the turn of Germany to mourn the death of one of her greatest scholars, Kurt Sethe. Following the lead of his great master, Erman, Sethe produced his monumental work *Das Aegyptische Verbum*, a work which almost more than any other has placed the study of the Egyptian language on a sound and secure basis. All modern knowledge of ancient Egyptian is founded on those twin masterpieces, Erman's *Grammatik* and Sethe's *Verbum*. Sethe's speciality was the early form of the language, and his edition of the Pyramid Texts must be the authoritative rendering for years to come. It is a matter of deep regret that his translations of those texts were so fragmentary; had he only completed even a tentative translation he would have conferred a great boon on posterity. Latterly he devoted much time to the study of Egyptian phonetics, a difficult subject in which few are fit to follow him. In Sethe, Egyptology has lost one of its most eminent workers; his death leaves a blank in the world of scholars which can never be filled.

M. A. MURRAY.

### PROFESSOR A. S. HUNT.

By the death of Professor A. S. Hunt, English papyrology loses the last of its founders, who for nearly forty years had maintained a steady output of publication of the highest value to students of the Hellenistic and Roman periods. He was a brilliant scholar and tireless worker; and the series of volumes issued by the Egypt Exploration Society, in the earlier of which he bore an equal share with Bernard Grenfell and for the latter was almost entirely responsible, represent an achievement which few men can rival. At the same time he was always ready to help and advise anyone engaged in research of a similar kind, and placed his stores of knowledge freely at the disposal of enquirers: and in private life he was the kindest of friends. In him the scholar and the gentleman were happily blended.

J. G. MILNE.







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